DEC 1 1882
No. 15493

REVIEW OF THE
# TELEGRAPH AND TELEPHONE
A JOURNAL OF ELECTRICAL, SCIENTIFIC AND MECHANICAL NEWS.

Vol. 1, No. 20. NEW YORK, DECEMBER 1, 1882. $2.00 Per Annum. Single Copies, 10 Cents

Copyright, 1882, by GEORGE WORTHINGTON. Entered at Post Office, New York, as Mail Matter of the Second Class

### Only.

Only a small bit of paper,
With just a few dates—nothing more—
Which at an unfortunate moment
Glides down from my sleeve to the floor.

Only an Argus-eyed proctor,
Who, ever upon the *qui vive*
Picks up, with suppressed exultation,
The paper which dropped from my sleeve.

Only four months in the country—
An extra vacation, that's all;
But the trade of proctor still strikes me
As something exceedingly small.

### A Great Reform.

"Gas hath its victims no less than war," says the poet. It is pleasing, therefore, to observe the vast numbers of people who are swearing-off Gas—many of them men and women who have revelled for years in Gas.

The victim of Gas has heretofore been remarkable for obliquity of vision. There could be no more ineffably ridiculous travesty on "light" than the phosphoresence which is emitted from the street lamps in our cities, yet a man who has indulged for years in a wild career of Gas will stoutly maintain that it is an excellent light, a soft, mellow light, and a light of the regulation sixteen-candle power, even though it be no stronger than the coruscations of his own intellect. This fore-shortening of faculties is peculiar to the miserable victim to Gas, though changes—or, to speak more correctly, developments—in the various methods of illumination have led to a great reform in the ranks of the blind and wilful advocates of Gas. For instance, when, about a year ago, General Daniel E. Sickles, an inveterate victim to Gas, locked up his house and went to Europe, remaining there all summer, and returned home to find that his vile and untruthful Gas-meter had charged him for 7,000 feet of gas, while, in fact, the premises had been vacant, he promptly recognized the error of his ways, and swore off Gas.

Since then, many other nearly hopeless Gas consumers have been redeemed and have taken to the Electric Light, but there yet remain many people revelling in the luxury of Gas and irrevocably addicted to its use. But now, since the full glare of the Electric Light has been turned upon the Gas-meter, much has been learned of the true character of that harmless-looking but terrible engine for the destruction of men's reason and fortunes. The Gas-meter has been well described as "a recording instrument which is designed to show how much gas ought, in the opinion of the gas company, to be consumed in any one household in a given time." Now, let the reader gaze upon the haggard countenance of the unlucky householder who has a Gas-meter on his premises, and who, while secretly indulging in wild orgies of Gas, is contemplating the vastness of his ruin as "quarter-day" approaches.

Of all the execrable contrivances for ruining men financially, and driving them to suicide, the Gas-meter is the most effective; and, more so, since it is about the least suspected. The depraved victim to Gas will pawn his wife's seal-skin sack to pay exorbitant prices for Gas which he never used, but which has been recorded by the vile and untruthful Gas-meter. In his mad appetite for more Gas he disregards the piteous appeals of his wife and children, and boldly throws away his money to buy new silk dresses for the bloated Gas-man's wife. Professedly religious people openly burn Gas galore, and in the most shameless manner, and churches loaded down with debt indulge in Gas as extravagantly as the most forlorn Gas victim, and pay the enormous bills of the sinuous Gas-meter as cheerfully as though the cheap and radiant Electric Light had never been invented. But it is becoming apparent to all that the Gas-meter will reduce the swaggering millionaire to pauperism quicker than will a long career of gambling and dissipation; for, even should he at first be able to pay the enormous bills, their growing proportions will gradually lead him into utter recklessness in other affairs of a business character; and it will only be when, as a ragged and friendless outcast, he sleeps at night on the benches in the public park, that he will recognize that his downfall commenced when he foolishly began to indulge in Gas.

Owing to the foreshortening of their intellect, already referred to, those who are incurably addicted to Gas assert that, notwithstanding its disenchanting odors, it is absolutely necessary to render darkness visible, since the new Aladdin's lamp—the apotheosis of artificial illumination, the Electric Light—is dangerous to property and to human life. After a prolonged spree of Gas, they will tell us of the careless Electric Light lineman, who by accidentally "making" the circuit with his screw-driver, had that useful implement melted in his hands, and of the unsuspecting Dutchman who unwittingly "short-circuited" an Electric Light circuit with his dinner-pail, thus producing instantaneously, to his astonished gaze, four pounds of incandescent sour-kraut, about a pound of singed "speck," and a brilliant voltaic arc between two pretzels. Of course, ignorant or fool-hardy people—those who "just touch" the buzz-saw to see how fast it is going, and can then only judge the speed by the number of fingers they have lost—cannot be provided for in any state of life; and, while there may be some danger to such people in Electric-light conductors, the victims of Gas are as a thousand to one. Indeed, the sturdy manner in which the inordinate use of Gas is encouraged by undertakers, grave-diggers, and coroners, is proof positive that the numberless explosions, conflagrations, and deaths from the asphyxiation of countrymen who "blow out" the Gas, bring a rich harvest to the members of those doleful professions. Nay, further, the latest newspapers from England tell us that while the vestrymen of Mile End were gravely discussing the question of introducing the Electric Light into their district, an explosion of Gas occurred in the consultation chamber, by which the chandeliers and windows in that and an adjoining room were shattered to fragments, the window frames forced out, and nearly a dozen vestrymen thrown under the table. One of the latter, who had been notoriously addicted to Gas all his life, but who had just had one side of his whiskers blasted off, immediately moved that they all swear off Gas, and it was unanimously resolved to introduce the cheap and radiant Electric Light.

Thus the few and faint, but rather fearless men who still intend to revel in Gas, are being gradually burned up or blown to smithereens by indulging in it to excess, but wiser heads are promptly swearing off and taking to the milder but refulgent Electric Light, and applications for connections are becoming more and more numerous from penitent and reformed Gas consumers. Improvements in the methods of Electric lighting, and dynamos now being made with a capacity of 5,000 lights each, will soon turn night into day, and the last victim of Gas will be carried to his untimely grave under the fitful glimmer of his alleged light—no stronger than the luminous exhalations which we see at night over a marsh.

### The Incandescent Electric Light.

It is suggested that the gaslight has at least *one* function that cannot be assumed by the electric light, and, on the principle of giving the devil his due, we publish the following remarks, which are pertinent, and which will doubtless fall like lead upon the ears of the gas blowers, who have expected that, among the other good qualities of the incandescent electric light, that of affording a still more scientific means of transit to the undiscovered country even than the spicy breezes of carburetted hydrogen would reign pre-eminent:

"The incandescent electric light has, no doubt, many advantages over gas, but it has nevertheless one glaring defect which we fear can never be remedied. It has become the custom of a large portion of our people to blow out the gas upon retiring. This not only puts out the gaslight, but also the light of exist-

ence of the individual immediately concerned, and has therefore become a cheap and effective means for securing a happy dispatch. But an incandescent light cannot be blown out, though the blower blow never so powerfully; and, as the gas-blowing mortal can never be expected to turn the stopcock, he is not only cheated of his euthanasia, but also of his sleep, unless, indeed, he be like the owl, and sleep best where the light is strongest. Clearly, the electric light can never wholly usurp the province of gas."

### Manufacturing Interests.

We give from the census bulletin, the relative values of the annual products of the manufactories of the three largest manufacturing States, viz.:

| | |
|---|---|
| New York | $1,080,638,696 |
| Pennsylvania | 744,748,045 |
| Massachusetts | 631,511,484 |

These are the respective interests of these States in manufactures, protected and otherwise Yet, while the manufacturers of New York and Massachusetts are not recognized, collectively, as the enemies of Tariff revision and reform, Pennsylvania is a unit in defence of the highest attainable protection, and against every practical step toward adjusting a war Tariff to peace times. On this issue Judge Kelly and Samuel J. Randall are as "unanimous" as though they were Siamese twins.

It is well for manufacturers who want to avert a revolutionary intermeddling with the Tariff, by throwing overboard its absurdities and cutting down its excessive duties, to consider whether New York or Massachusetts should not revolt against the continued despotism of Pennsylvania over the action of Congress on the tariff.

### The Faure Electric Storage and Light Company.

Articles of incorporation were filed on November 15, in the County Clerk's office, in New York City, or the Faure Electric Storage and Light Company, with a capital stock of $2,000,000, divided into 20,000 shares of $100 each. The trustees of the company are Messrs. David I. Carson, Henry H. Talmadge and Lewis C. Talmadge, all of this city. The object for which the company was formed is to manufacture, purchase and sell all kinds of electrical apparatus and machinery, to acquire by purchase or otherwise patents relating in any way to electricity or to machines in any manner connected with or relating to electricity, for lighting, storage, motor or any other purpose whatever, and especially to acquire and work all patents and inventions of Camille A. Faure and Charles G. Perkins, and to grant a license for working them. The company has obtained from the Force and Light Company, which controls the Faure patents for the United States, the right of those patents for seventeen Western States. In addition to this it owns other valuable electrical patents for the whole country. The gentlemen at the head of the enterprise expect to be ready for business in two or three weeks. We hope to give further details of the Company's objects in a future issue.

### Electric Lights on the Hudson.

But a short time ago the electric light was an invention nowhere in use on the Hudson; but to those who now sail up and down the river the electric lights at Newburg and Poughkeepsie have become familiar objects. The first electric light made use of on the Hudson was by the Pennsylvania Coal Company at Newburg, who have for several years past made use of five in the summer months. Their lights have become very familiar and useful to pilots, for their glare lights up the whole river. There are also several large manufactories in Newburg that make use of the light. The upper furnace at Poughkeepsie make use of two; one of these, having the wall of the building for a reflector, sends out a magnificent light over the river. Electric lights are now in general use at Hudson, a complete system having been established; and recently there were received at the West Point Foundry, at Cold Spring, an engine and dynamo machine for twelve lights.

At the annual meeting of stockholders of the Edison Electric Light Co., held Nov. 21, the following trustees were elected for the ensuing year: S. B. Eaton, Thomas A. Edison, Edward H. Johnson, Calvin Goddard, M. F. Moore, E. G. Fabbri and W. A. Meadowcroft. The board of trustees therefore, with the exception of Mr. Edward H. Johnson, will be the same for 1883 as for the current year.

### The Edison Light.

At a dinner recently given in this city by Professor Henry Draper, to the National Academy of Science, the table was beautifully decorated, an exceedingly novel and æsthetic effect being produced by the introduction of Edison's electric incandescent lights in the form of flowers, which were enclosed in large center pieces of natural flowers and plants. There were eight stands placed at regular intervals in a solid bed of cut roses, while suspended from the arch of the folding doors hung an elaborate artificial festoon of vines, from which the lights representing morning-glories of different colors and shades peeped out. Under this, on the middle of the table, rested a large aquarium filled with tiny gold fish, and in the water was submerged a bell-shaped light, which caused the fish to wink in a very disrespectful way at Professor Baird, who sat close by. In all there were twenty-nine lights, each having the power of ten wax candles, but their brilliance was carefully subdued by the ground and colored glasses. Although the electricity was supplied by a gas engine in the Professor's laboratory, there was not the slightest perceptible flicker to distress the most delicately organized eye. The charming effect was doubly enhanced by the reflection in the large mirror in the back parlor, and looking down the table from the upper end a fairy-like scene was presented; the glittering flowers of light reminding one of the jewels which Aladdin plucked from the trees in the miraculous garden of the lamp.

### An Aerial Electric Light.

An interesting experiment has been made in Paris by M. Mangin, a member of the Académie d'Aérostation. A small balloon, measuring about 100 cubic feet, and filled with pure hydrogen, was sent up, being held captive by a rope containing two copper wires. A Swan incandescent light having been placed in the gas and attached to the top of the balloon was lighted, and the whole aerial machine was splendidly illuminated. It was shown by systematic interruptions that the dots and dashes of the Morse system could be imitated for giving military signals at a great distance.

### An Electric Wagon.

The improvements in the storage of electric energy and in electro-motors have so far advanced, says *Knowledge*, that tricycles can be lighted and propelled by electricity, as was seen from the tricycle lately ridden by Prof. Ayrton in London. The Faure accumulators, in which the energy was stored for the lighting and driving, were placed on the footboard of the tricycle, and the motion was produced by one of Professors Ayrton and Perry's newly patented electro-motors, placed under the seat of the rider. Using one of these specially-made tricycle electro-motors and the newest type of the Faure accumulators, the total dead weight to be added to a tricycle to light and propel it electrically is only 1½ cwt.—a little more than that of one additional person. In the tricycle ridden by Professor Ayrton the ordinary foot treadles were entirely absent, but with ordinary electric tricycles it may be desirable to leave the treadles, so that, while electric propulsion alone is used on the level, the rider can, on going up a steep hill, supplement it by using the treadles, instead of, as at present, with the ordinary non-electric tricycle, having to get out and ignominiously push his tricycle up the hill before him.

### Observations on Earth Currents.

By Dr. O. Frolich.

At the request of the Committee on Earth Currents appointed by the Electro-technical Association, the firm of Siemens & Halske have modified their so-called "soot-writer" (Russ-schreiber), so as to regiser earth currents continually. For a trial of this apparatus, one of the wires from Berlin to Dresden was placed for a time at the disposal of the committee, and some interesting results were obtained.

The apparatus consists essentially of a current-disc moving in a constant magnetic field. Its movements are registered by a pointer upon a slip of paper blackened over with soot and drawn slowly forward by clock-work. The zero line is indicated constantly by a separate index. The ordinates of the curves drawn upon the paper are proportional to the currents prevailing at the time. The movement of the paper is regular and amounts to 117 millimeters hourly. The wire was sunk in the earth at Dresden, and was connected with the earth at Berlin by means of the soot-writer. A Daniell element, introduced into the circuit, gave a deviation of about five millimeters at the soot-writer. The author figures the curves obtained on the evening of July 22d, from 7.30 to 9.30 P.M., and on July 25th, from 5.45 to 7.45. On the first occasion the weather was sultry, with some rain; on the second there was a strong thunder-storm, with frequent flashes of lightning. On both occasions the current curve showed a tolerably uniform course, accompanied by sudden convulsive deviations. If we neglect these, we find in the curves prolonged periods in which the index made continually a track of a certain width in the soot, being in constant movement. This is evidently due to the induction-strokes produced by telegraphing in the neighboring wires of the cable. These inductions, especially if the Hughes' apparatus is employed, are of equal strength and compensate each other, so that the course of the curve is not disturbed and the middle of the broad track represents the value of the real earth current.

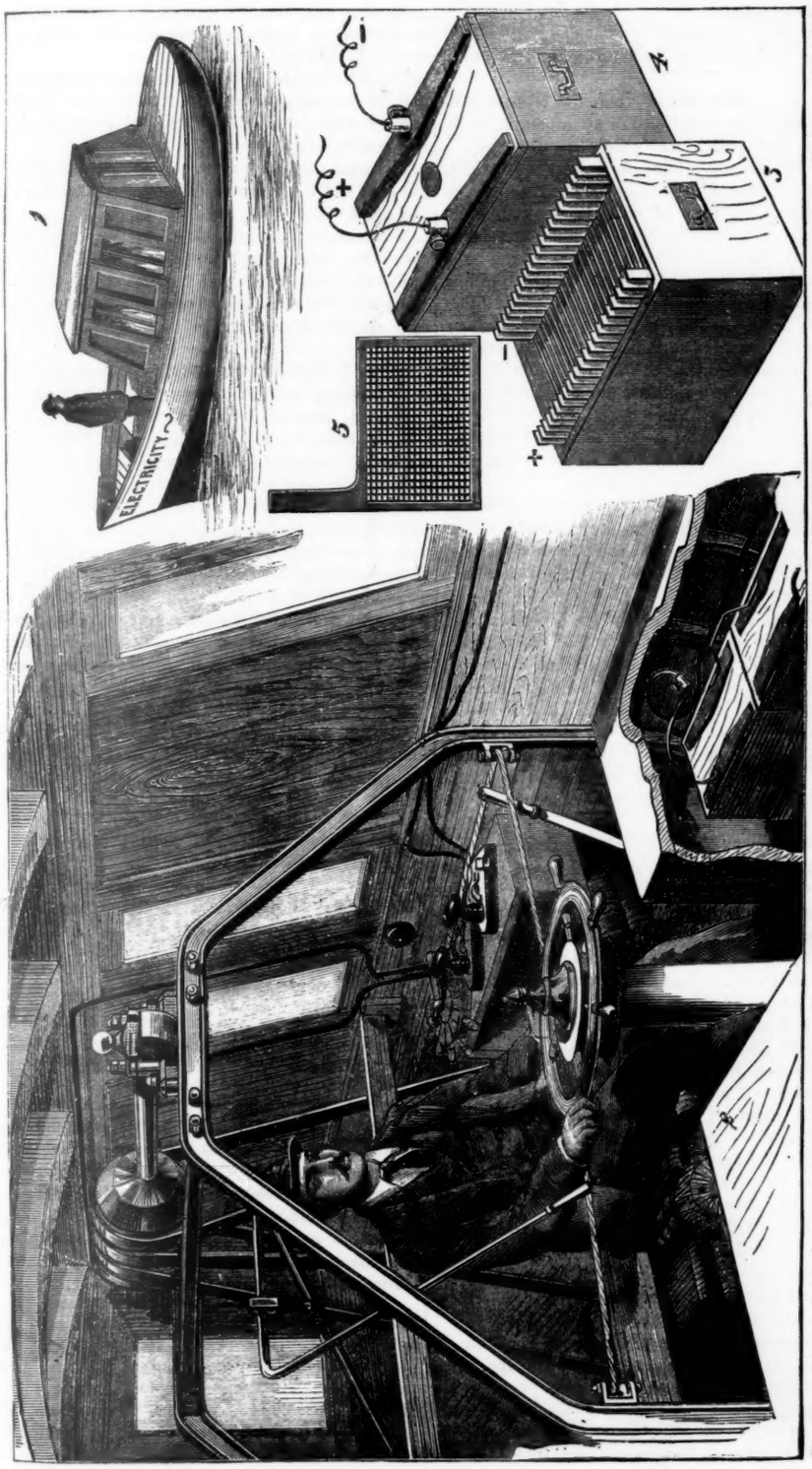
Of the sudden deviations in periods when no dispatches are being sent, some, though but few, are due to telegraphic attention signals. No regular periods of the earth-current could be recognized in the curves obtained either on these days or on others. The curve obtained during the thunder-storm is of especial interest. The course of the curve of the earth-current did not differ essentially from that obtained on the former occasions. Very conspicuous are the numerous, and in part very powerful, induction-strokes in which the course of the storm may be traced. These induction-strokes coincide with atmospheric discharges, for in a number of cases, where the time was noted, the official watching the apparatus observed lightning simultaneously. The deviations in the curve of July 22d may be due to fainter or more remote atmospheric discharges.

The chief result of these observations seems to be that during a thunder-storm the character and the strength of the earth-current are not essentially changed, and that the whole influence of the storm is expressed in induction strokes, which are due to atmospheric discharges.—*Electro-technisch Zeitschrift.*

### The Electric Launch "Electricity."

This little craft, which has been designed by Mr. A. Reckenzaun, C.E., and constructed at the works of the Electrical Company, at Millwall, is, we believe, only the third vessel propelled by electricity which has ever been constructed. The trial trip was recently described in *The Times* by Professor Silvanus P. Thompson, who was a passenger on the occasion. The boat, appropriately named the *Electricity*, is 25 feet in length and about 5 feet in the beam, drawing 1 foot 9 inches forward and 2 feet 6 inches aft, and is fitted with a 22-inch propeller screw. On board were stowed away under the flooring and seats, fore and aft, forty-five electric accumulators of the latest type as devised by Messrs. Sellon and Volckmar. Fully charged with electricity by wires leading from the dynamos or generators in the works they were calculated to supply power for six hours at a rate of 4-horse power.

These storage cells were placed in electrical connection with two Siemens dynamos of the size known as D 3, furnished with special reversing gear and regulators, to serve as engines to drive the screw-propeller. Either or both of these motors could be "switched" into circuit at will. In charge of the electric engines was Mr. Gustave Phillipart, Jr., who has been associated with Mr. Volckmar in fitting-up of the electric launch. Mr. Volckmar himself and an engineer completed, with Professor Thompson, the quartet who made the trial trip. After a few minutes' run down the river, and a trial of the powers of the boat to go forward, slacken, or go astern at will, her head was turned citywards, and the boat sped silently along the southern shore, running about eight knots an hour against the tide. In about an hour London Bridge was reached, where the head of the launch was put about; and, slipping down the ebb, the wharf at Millwall was gained in twenty-four minutes, the mean speed of the vessel being nine miles an hour. For the benefit of electricians, Professor Thompson states that the total electromotive force of the accumulators was ninety-six volts, and that during the whole of the long run the current through each machine was steadily maintained at twenty-four amperes. Calculations show that this corresponds to an expenditure of electric energy at the rate of 3-1.11 horse power. The boat will carry twelve persons.




1. View of Boat.—2. Interior of Cabin, showing arrangement of driving and steering. The wheel for steering is in the centre. The lever on the man's right is for reversing. The lever on his left is for starting and stopping. The switches with black handles are for connecting the secondary Batteries with the two Siemens' dynamo machines. The seat is broken so as to show the mode of stowing away the secondary Batteries.—3. A secondary Battery with lead plates ready to be fastened up.—4. A secondary Battery, with the lid fixed on, and with two lead plates on the top connecting the negative and positive poles of the plates inside the Battery.—5. One of the lead plates of the Battery.

THE NEW ELECTRIC BOAT "ELECTRICITY," RECENTLY SUCCESSFULLY TESTED UPON THE THAMES.

### A Warning Lamp.

An ingenious adaptation of the electric signaling system has been effected in connection with a lamp which is made to give notice of either a burglarious entrance into or a fire upon premises where it is employed. The apparatus consists of a small battery with wire leading to attachments on doors and windows, and other wires communicating with the lamp which may be placed either inside or outside the premises, as preferred. Upon a door or window being moved, after the apparatus has been set for the night and the lamp lighted, a red glass disc is released by the aid of a small electro-magnet placed within the lamp, and a red or danger signal is thus given, the light having previously been white. For fire purposes a special thermometer is used, and when the raised temperature causes the mercury to rise, metallic contact is made, and the lamp at once shows the danger signal. Placed outside houses or public buildings, this lamp would afford a sure index to the police as to the safety or otherwise of the interior of the premises. It is being shown at No. 23 Ludgate Hill, London.

### Electrical Companies Incorporated.

Among the companies incorporated recently at Albany, were the following named:

The Faure Electrical Storage and Light Company of New York, capital $2,000,000; the Metropolitan Electric Light and Power Company of Brooklyn, capital $1,000,000; the Spanish and New York Telephone Company of New York, capital $1,000,000, and the Electric Candle Company of New York, capital $200,000; the Brooklyn District Telegraph Co., Limited, 183 Montague Street, Brooklyn, N. Y., F. M. Delano, President; E. T. Haines, Secretary and Treasurer; H. McGonegal, Vice-President and General Manager; S. D. Lake, Superintendent.

The principal London theatres hold the following number of persons: Drury Lane, 2,751; Her Majesty's, 2,444; Astley's, 2,407; Covent Garden, 2,299; Alhambra, 2,208; Surrey, 2,161; Princess's, 1,687; Sadlers Wells, 1,568; Lyceum, 1,455; Adelphi, 1,347; Savoy, 1,274; Imperial, 1,271; Gaiety, 1,243; Haymarket, 1,158; St. James, 1,105; Globe, 942; Olympic, 889; Avenue, 884; Court, 728; Strand, 704, Criterion, 675; Toole's, 657; Royalty, 645; Prince of Wales, 504. There are altogether in London 41 theatres, holding 55,326.

# REVIEW
OF THE
# Telegraph and Telephone,

(AN ELECTRICAL JOURNAL)

PUBLISHED SEMI-MONTHLY AT 23 PARK ROW.
P. O. BOX, 3629.

*GEO. WORTHINGTON, - - Editor and Proprietor.*

SUBSCRIPTION.

United States and Canada, $2 00 per annum, in advance.

Great Britain and other foreign countries, $2.50 = 10s. = 13 francs, in advance. Postage free.

ADVERTISING.

Transient rate, 35c. per line each insertion.
"Business specials," 50c. a line.

EDITORIAL ANNOUNCEMENT.

*We invite correspondence from Electricians, Inventors and the Telegraph and Telephone fraternity on matters pertaining to electrical and scientific subjects, and all facts of special interest in connection therewith.*

*Those desiring to recommend their goods can do so to any extent in our advertising columns, but we will not publish for pay anything of that nature in our reading columns.*

*Subscribers can at any time have the mailing address of their paper changed by sending both old and new address. Wm. Dawson & Sons, 121 Cannon Street, London, England, are our accredited representatives for Great Britain.*

*The Editor does not hold himself responsible for opinions expressed by his correspondents.*

*No notice is taken of anonymous communications.*

DEALERS SUPPLIED WITH THIS PAPER BY

The American News Company, New York.
The American News Company. Denver, Col.
The American News Company, Kansas City, Mo.
The American News Company, St. Paul, Minn.
The New York News Company, New York.
The New England News Company, Boston, Mass.
The Central News Company, Philadelphia, Pa.
The Western News Company, Chicago, Ill.
The St. Louis News Co., St. Louis, Mo.
The Cincinnati News Company, Cincinnati, Ohio.
The Pittsburgh News Co., Pittsburgh, Pa.
The Baltimore News Company, Baltimore, Md.
The San Francisco News Co., San Francisco, Cal.
The Montreal News Company, Montreal, Canada.
The Toronto News Company, Toronto, Ontario, Canada.
Wm. Dawson & Sons, London, England.
J. N. Duquet, Quebec, Canada.
H. A. Kramers & Son, Rotterdam, Holland.
Berthold Mendel, Berlin, Germany.

NEW YORK, DECEMBER 1, 1882.


CONTENTS.


| | Page |
|---|---|
| A Great Reform, by Joseph Christie | 305 |
| Faure Electric Storage Co | 306 |
| Electric Light on the Hudson | 306 |
| The Edison Electric Light | 306-309 |
| An Electric Wagon and Electrical News | 306 |
| Observations of Earth's Currents | 306 |
| The Electric Boat on the Thames | 307 |
| Standard Time by Telegraph | 308 |
| Various Electrical Items | 308-9 |
| New Underground Wire System | 309 |
| Telegraphic News | 310-311 |
| Telephonic News | 311-312 |


Annually the lead mines of the world yield about 400,000 tons, and of that quantity the United States is credited with 100,000 tons. Mexico, South America generally, Canada, and Australia yield almost nothing of that metal. Spain heads the list of lead-mining countries, with 120,000 tons.

## Standard Time by Telegraph.

Electricity, in some form or other, has steadily made such inroads into nearly all of the commercial and domestic economies of life, that there would seem to be "no more worlds" for it to conquer.

Not the least of the new and useful applications of this patent agent is the entering of our offices, factories, home firesides, &c., to give us uniform *time*.

The subject of electric time is not altogether new, but it has been reserved for the Time Telegraph Company of this city, which we briefly alluded to in our last number, to develop such a comprehensive system for the general distribution of time by telegraph as the public demands.

Erratic efforts in a small way have been attempted from time to time which have resulted in as many failures.

So far as we are informed, there has been no general systematic plan developed or attempted hitherto, to furnish *time* which met public requirements.

Either the electric appliances were sold outright, at prices so high as to prevent their general use, or the apparatus has been of such an unreliable and complicated character that rendered it impracticable.

The Time Telegraph Company has secured a large suite of offices in Temple Court (the Kelley Building in Beekman street), where the executive and other offices are located. They have two rooms fitted up with electric clocks of various styles and action, indicating the standard time of the principal American cities and European capitals. Some months ago a strong syndicate was formed for the purpose of investigating the subject of electric time, and, if found practicable, to crystallize their efforts into a company for the purposes mentioned hereafter.

Every European and American patent relating to the subject of electric time, has been carefully examined by one of the best patent expert firms in the city, and all patents that were considered important have been secured.

The mechanical experts of the syndicate were unable to find in any one patent all of the requisite points of merit. As usual, in electrical devices, it was found that one inventor had secured some important principle, but his device as a whole would be unsatisfactory, as some one else had already patented the requisite part which would make his invention a success. Hence the company was obliged to secure several patents in order to cover the mechanism desired.

The Company will sell no plant except in cases where it is inconvenient to furnish the time on rental.

The purpose is to furnish uniform and standard time to subscribers at a fixed monthly toll, the charge varying according to the style of the dial used.

The managers have had the uncommon sagacity to fix upon a scale of prices and adopt a policy in their dealing with the public, which will not only render their system justly popular but secure its general use. They act upon the belief that they have a service which the public wants and will appreciate if treated fairly. A plain six or twelve inch dial, denoting time by minutes and hours will be furnished for twenty-five cents per month. One of more elaborate design at fifty cents, and for jewelers and public offices, etc., they furnish a dial two or three feet diameter, indicating time in seconds, minutes and hours at one dollar monthly.

The Company makes no charge beyond the rentals stated, and leaves the subscriber at liberty to cancel his subscription at the end of any month.

In most new enterprises of an electrical nature, it is unsafe to depend upon mechanism for practical results which have not been proved in actual use. Almost any electric device can be made to operate well in an office under the care of the inventor or an expert; but put the same into actual use for the service designed and difficulties of defective mechanism, etc., arise that could not be conceived of in advance

The Time Telegraph Company starts into business with the advantage of synchronous mechanism which has been not only proved by the Pennsylvania Railway, but adopted by that company for *train service*. As touching the reliable character of their dials, no stronger endorsement can be made.

We will at a future time give more of the details of the system and manner of operation. The method of application and arrangements of circuits have all been copyrighted by the Company in additton to the patented mechanism employed. But the Company propose dealing with the public upon precisely the same terms as would be done if the business were wholly unprotected by patents.

The service to be rendered is necessarily expensive, and the charges made are as low as can be afforded, as all who are familiar with the telegraph business will readily admit.

A company opening up such an important field of industry and upon terms so liberal will have the cordial good-will of all.

With proper management we see no reason why the Time Telegraph Company should not become one of the great telegraphic features of the country. We wish it the immense success which it most assuredly appears to merit.

Mr. J. D Haines, of the firm of Delano & Haines, and Secretary and Treasurer of the Mexican Telephone Co., returned from Mexico a week ago, bringing his charming wife with him. Mr. Haines gives a glowing and satisfactory description of the Company's progress and condition in Mexico, and also the progress and condition of the sub-companies. The yarns he spins concerning his nautical experience are very interesting, and especially a description of a storm he encountered off the coast of Florida. The good ship "City of Alexandria," by which he was a passenger, weathered the storm bravely. The wrecks of two sailing vessels were encountered. Mr. Haines talks very sailorish, and a few more voyages would enable him to appear in the rôle of the Ancient Mariner, minus the "long gray beard," but not the "glittering eye." He is versed in nautical terms and can already explain the difference between the main sheet and the bed-quilt.

England has thirty electric light companies, with a capital of over $30,000,000. Nearly as much money is similarly invested in France.

On Nov. 20, the Plaza at Monterey, Mexico, was lighted for the first time by electricity. A large proportion of the 42,000 inhabitants were present to witness the illumination.

As to the nature and propagation of electricity, M. Ledies holds that they are substantially subject to the same mechanical laws which govern light and heat.

"THURLOW WEED," says the Philadelphia *Press*, "was the last of the great editors of the old school. Crosswell, Ritchie, and Prentice passed away long before him. Greeley, Raymond, and Bennett came between the old and the new—with much of the personality of the former, and something of the broad journalistic grasp of the latter—and they, too, went before the master-spirit of the earlier day."

Mr. Clarence W. Donnelly, for the past ten years in the employ of A. D. T. Co., and for some years past Chief Clerk in that Co., was appointed Auditor of the Mexican Telephone Company in the city of Mexico. His long experience in the New York office has fitted Mr. Donnelly to fill this position with credit to himself and his company.

## "Harry" Bassett.

Few telegraphers have been wished better things by their friends than Mr. Fred. N. Bassett, recently appointed chief clerk of the Post Office Department. Mr. Bassett whom his old telegraphic friends long since nick-named "Harry," after a famous racer of that name, came to New York from New Haven in 1873, and after making many warm friendships, during a term of service extending over a period of two years, was one of those who resigned from the Western Union office when the Associated Press wire to Washington was leased in 1875, he and Mr. W. G Jones, now the Manager of the Western Union office at Philadelphia, being the operators selected by Mr. Phillips for the Washington office. Mr. Bassett afterwards returned to New York and was for a while the assistant day manager of the Associated Press office in this city. When Mr. Phillips was transferred to Washington in 1878, Mr. Bassett quickly followed him and continued as one of the former's assistants until the advent of the Garfield administration, when overtures were made to him to enter the Government service, and he accepted the vacancy, July 1st, created by the promotion of John R. VanWormer, and became private secretary to Postmaster-General James. When the latter retired from the Cabinet to accept the Presidency of the Lincoln National Bank in this city, Mr. VanWormer accompanied him, but Mr. Bassett finding that his services would be acceptable to Judge Howe, decided to remain in Washington, which has always been his favorite place of residence. As private secretary to both General James and Judge Howe, Mr. Bassett has made a most brilliant record, and his advancement was entirely a matter of merit. The position of Chief Clerk is one of great influence and usually falls to some one who can bring strong political pressure to bear on the Postmaster-General, but Judge Howe seems to have ignored all political considerations and to have given the place to Mr. Bassett as a mark of esteem and as a token of his appreciation of his late private secretary's supreme fitness for the responsible and trying post to which he has been assigned.

After an extended trial of the electric light on board the Alaska, Messrs. Guion and Co. have given Messrs. Siemens Brothers and Co. an order, which is now nearly completed, for a complete installation on board the Arizona. There are 300 Swan lamps in the ship, every part of the passengers' and officers' quarters being lighted by them, to the complete exclusion of oil and candles. Very special attention is being paid to the illumination of the engine-room. There are three lamps in the screw shaft alley and thirteen beside the gauge glasses of the boilers. Lamp sockets are fitted near various parts of the engine that require occasional attention, such as the glands, and the men are provided with loose lamps in very strong globes, and of such a size that they can be carried in a jacket pocket and slipped into the sockets when required. Lamps with flexible leads are also supplied and can be coupled to the same sockets. The current is generated by two dynamo machines of the size marked bo the makers S D o o, each driven by a separate engine. Either machine will supply all the lights of the ship, so that there is no probability of a breakdown, although usually both will be in operation together. Provision is also being made to drive the ship's winches by electricity instead of steam, and thus avoid the usual steam and noise on deck.

The Société Générale des Téléphones, of France, has 3,695 subscribers of whom 2,451 are in Paris and 1,244 in the provinces The increase during the year has been 1,309. The number of communications during the past year was 143,774, as compared with 81,278 the previous year.

## The New System of Conducting Telegraph, Telephone, and Electric Light Wires Beneath the Streets.

PHILADELPHIA, Nov. 21.—The American Sectional Electric Underground Company gave an exhibition last night of the Mackintosh system of running electric light, telegraph, and telephone wires underground. The exhibition took place in the building at the corner of Spring Garden and Broad streets, and was attended by a number of electricians, insurance agents, and business men of Philadelphia, New York, Chicago, and Baltimore. Briefly described, the proposed system consists of a conduit or main constructed of iron plates so as to form a box. The top plates are provided with manholes at convenient distances, through which access may be had to the main. Each of the side plates has an opening through which connections may be made with street lamps or houses for telephone, electric light, or telegraph wires. Each wire is conducted through a metallic tube packed with rubber. Within the main is an upright with short arms projecting far enough to hold a rack on which to lay the line of tubes. When a wire enters a house for lighting purposes it is run direct to the lamp and out again to the conduit without breaking the circuit, and so on to the next light. The main trunk line, when constructed, will carry several thousand wires and leave room for a man to pass through. Each wire is protected by a metallic armor.

The advantages claimed for this system is that its introduction will remove from the streets the unsightly telegraph poles and prevent interference with the work of firemen often caused by the wires, and the damage to the telegraph companies resulting from broken wires. The wires will be prevented from interfering one with another, and the confusion and embarrassment resulting from induced currents will be prevented.

In the exhibition to-day four tubes were shown in a conduit, one of them containing an electric light wire, one a telegraph wire, one a telephone wire. The remaining tube had in it four conductors—two telephone wires and two telegraph wires—all of which were manipulated at the same time, yet no signs of interference from induction could be perceived. The telephone wire was in some places less than three inches from the electric-light wire, but no influence was exerted upon the electric-light wire. The exhibition was regarded as very satisfactory.

At its conclusion a banquet was served at the Bellevue Hotel, at which were present, among others from New York, Mr. A. S. Brown, general manager, and S. B. Field, electrician, of the Mutual Telegraph Company; General F. K. Hain, general manager of the Manhattan Elevated Railroad; W. A. Anderson, J. F. Halsted, Colonel W. L. Brown, C. A. Blanchard, and E. V. Smalley; from Philadelphia, Colonel R. Dale Benson, Colonel A. Louden Snowden, John E. Zeublin, Charles Hartshorne, Professor E. J. Houston, W. W. Harkness, Professor R. E. Rogers, General Joshua T. Owen, Chris. H. Cramp, and Andrew Wheeler; from Baltimore, Dr. C. C. Bambaugh, A. Wilson, jr., and J. T. Morrison; from Chicago, James McCartney, attorney-general of Illinois; D. J. Sweenie, Professor J. H. Barrett, Judge John I. Bennett, and Judge M. R. M. Wallace, and from Pittsburgh, William M. Conway.

Speeches were made by Colonel A. K. McClure, who presided; Professor Houston, of Philadelphia; Senator Ecclesine, of New York; Professor Barrett, of Chicogo; Attorney-General McCartney, of Illinois, and others.

"What ails the telephone?" yelled the editor to the central office, which he had been vainly calling for ten minutes. "The battery wants to be charged," came the indistinct answer. "Well charge it," murmured the editor, mechanically. It gets to be a second nature with some.

## Isolated Electric Lighting.

The Edison Company for Isolated Lighting has just passed the first year of its existance, and in the report of its Board of Directors, made to the annual meeting of the Stockholders on November 21st, it is stated that the business of the Company for the year ending November 19th, was 137 installations of isolated plants of capacities varying from 15 to 800 lights, the total number of lamps being 25,781. These installations are in various parts of the United States, mostly in factories. Many of them, however, are in hotels and steamships. There are also the following newspaper offices lighted with Edison isolated plants: The New York *Herald*, the Philadelphia *Ledger*, the Philadelphia *Record*, the Ohio *State Journal*, the Boston *Herald*, the Baltimore *Sun*, and the Davenport *Gazette*. The New York *Times* is also lighted by the Edison light, but this illumination is obtained from the General Station on Pearl street. Not one of these isolated plants which has been introduced has been rejected. On the other hand, many of them have been largely increased after trial. The following is a list of the plants increased up to the present time:

The Pemberton Company, of Lawrence, Mass., have increased their plant from 125 B lamps to 300 A lamps; the Merrick Thread Company, Holyoke, Mass., have increased their plant from 120 to 400 B lamps; the Danforth Locomotive Works, Paterson, N. J., have increased from 60 to 150 A lamps; Weed, Parsons & Co, Albany, N. Y., from 120 to 500 B lamps; Sayles & Washburn, Mechanicsville, Conn., from 120 to 300 B lamps; and the Wamsutta Mills, New Bedford, Mass., increased from 60 to 750 A lamps. H. K. & F. B. Thurber & Co. have made two additions to their original number, the first from 60 A lamps to 96 A and 80 B lamps, and the next to 250 A lamps.

Financially speaking the Edison isolated plant business for the first year has also been a success, the report above spoken of stating that up to November 1st, the operations of the Isolated Company showed a net profit of 14 per cent. on the stock.

In reply to our inquiry concerning the progress made by the Edison Campany, Major S. B. Eaton, Vice-President and General Manager, very kindly furnishes us the following information which all will agree is an excellent showing:

"The Edison Electric Illuminating Company of New York are now lighting one hundred and ninety one buildings from one central station on Pearl street. The aggregate number of lamps in these buildings is 4,288, and of this number over 2,700 are usually burning all at the same time. These one hundred and ninety-one buildings have been inspected favorably by the New York Board of Fire Underwriters, and certificates for the use of the light in all these buildings have been issued by the Board. We are connecting additional buildings as rapidly as possible, and if the Board of Underwriters afford us the same facilities for having our work inspected and passed upon by them during the next week, as they have during the past week, we shall have at least 1,000 additional lamps burning before the 1st of December, in say fifty additional buildings We are now running two dynamos in the daytime and are running three dynamos from 4 to 7 o'clock in the evening. Next week we shall start a fourth dynamo. We have recently made a canvass among all the consumers of our light to ascertain how the light is liked, and the satisfaction is so great that we believe our plant will within a few weeks prove inadequate to supply the demand for our light. In other words we have not put in a plant large enough to supply everybody that wants the light. The insulation of our underground conductors continues to be perfect. Our plant has been recently inspected by disinterested electricians, who invariably verify all that we claim as regards the entire absence of leakage on the part of our conductors. Our dynamos have not been stopped one moment day or night since we were started September 4th."

# Telegraphic.

The cable dispatch office at 16 Broad street is gradually becoming the principal point for the reception and distribution of cablegrams throughout the United States. They now have direct Chicago and New Orleans wires, and cablegrams received direct from cable termini are forwarded direct. In short, all cable business is gradually being withdrawn from 195, and is done at 16 Broad street, and in the course of time they will have separate direct wires to every leading city.

### Jay Gould and the Mutual Union.

ALBANY, Nov. 21.—In the matter of the application of William H. Cameron and Jay Gould, stockholders in the Mutual Union Telegraph Company, for the commencement of an action to vacate the charter of said company, a hearing was had before Attorney-General Russell to-night. The application is based on the ground that the company has unlawfully issued $10,000,000 of capital stock, when its authority is limited by law to the issue of $1,200,000; also that $5,000,000 of the bonds were issued in payment for the construction of telegraph lines worth about $3,500,000. The application was favored by Julian T. Davies, Edward C. James, and J. H. Work. Robert Sewall, Judge Ashbel Green, Fisher A. Baker, and John W. Simpson appeared for the company.

Mr. James held that the Attorney-General must grant the application because the Mutual Union had violated the law in increasing its capital beyond the limit fixed in its articles of incorporation, and because the stock so issued had been illegally divided among the officers of the company under guise of a construction contract. Mr. Sewell presented affidavits from Charles F. Peck, Secretary of the company; John G. Moore, President; George F. Baker and George William Ballou, Directors, and Wilson H. Fairbank, telegraph expert, certifying that the increase of the capital stock was made with the general consent of the stockholders. The Attorney-General reserved his decision.

### The Mutual Union Telegraph Litigation.

ALBANY, Nov. 22.—In the proceedings before the Attorney-General against the Mutual Union Telegraph Company, the papers presented contained an affidavit from Supt. James Merrihew, an expert in the construction of telegraphs, which stated that, allowing the sum of $600,000 as a margin for contingencies, the cost of the entire system of the Mutual Union Telegraph Company was $4,070,350. A tabulated statement of the existing lines of the company was attached, derived from a map and pamphlet issued by the Mutual Union Company itself, and dated Oct. 1, 1882. This last showed a mileage of wire amounting 30,346 miles, and a mileage of poles of 5,500 miles. Among the papers submitted was also a statement to the Stock Exchange dated June, 1882, wherein the company claimed that it had a mileage of wire to the extent of 48,000 miles, and pole line to the extent of 7,000 miles.

The enormous sum of $202,000,000 is invested in the submarine cables of the world, supposed to aggregate 64,000 miles in length.

The deacon's son was telling the minister about the bees stinging his pa, and the minister inquired: "Stung your pa, did they? Well, what did your pa say?" "Step this way a moment," said the boy "I'd rather whisper it to you."

Subscribe for Review of the Telegraph and Telephone and Electrical Journal.

### Mr. Garrett's Cable Speech.

President Norvin Green, of the Western Union Telegraph Company writes to the President of the Baltimore Chamber of Commerce that the imputation that an improper scrutiny of cable messages is exercised by the company is without a shadow of foundation in fact. In a speech before that body, last Wednesday, Mr. John W. Garrett is reported to have said:

"An application was made on behalf of the Baltimore and Ohio Company to the managers of the Direct United States Cable Company, of which the distinguished Mr. John Pender of London is president, whether the Baltimore and Ohio Company could forward cablegrams to France by that company without going through the hands of the Western Union Company, as, unless this assurance could be obtained, the Baltimore and Ohio Company would prefer to use the mails. The response to this inquiry was that this could only be done with the understanding that should these cablegrams contain anything affecting the Western Union Company in any way it would be the privilege of that company to inspect them, and that all cablegrams received from the other side are sent direct to the Western Union main office, and from there distributed."

In response, Dr. Green submits this cable dispatch from Mr. Pender:

"All that was said was that cable messages at the present moment passed through and were distributed by the Western Union office at New York. As for Western Union Company's executive scrutinizing messages, nothing of the kind ever passed my lips."

Mr. George G. Ward, general manager in this city, of the Direct Cable Company, says:

"I made no statement to any one that would warrant the inference that your company had or exercised the privilege in question, nor have I ever known of any right claimed or practised by your company, or any one connected therewith, to supervise or inspect cable messages."

### Economy in Telegraphing.

THE USE OF REGISTERED ADDRESSES AND CODES BESIDES CIPHERS.

There are one hundred and sixty thousand registered addresses kept by the Anglo-American, Direct United States, American Telegraph, and French Cable Companies, which are managed by the Western Union Telegraph Company. These addresses comprise the names of the principal business firms sending and receiving cable dispatches in this country. To each of these registered addresses is appended one word, which represents it in all cable messages. This one word is always telegraphed instead of the address. One object of this registration is to save the expense of telegraphing. As the cost of cable dispatches is fifty cents a word, it will readily be seen that a very considerable amount is saved, when, as in some cases, as many as thirty messages a day are sent both ways. A firm of four names would thus save nearly a hundred dollars a day. Another object is to secure the utmost certainty of prompt delivery.

Much money is also saved in telegraphing, not only by cable, but by land lines, in the use of codes. All the leading branches of business have these codes, by means of which long messages may be sent by the use of few words. There is no extra charge for sending code messages by cable, as the words are always those that may be found in the dictionary. But there are many cipher dispatches sent composed of letters or figures. These are charged extra by counting three letters or figures to each word. A leading telegrapher said yesterday that, were it not for the adoption of these expedients, it would be simply impossible to transact the business of telegraphing. There would not be time to do the work with present facilities.

### Postal Telegraphy.

At a meeting of the Board of Trade and Transportation, held in this city recently, Mr. F. B. Thurber made an address setting forth arguments in favor of the adoption of a postal telegraph. Mr. Thurber began his address by stating that the National Board of Trade, representing a majority of the commercial organizations of the country, had at its last two annual meetings urged the adoption of a postal telegraph. Subsequent events, he said, had amply demonstrated the correctness of the report. Experience in the past had shown that competition between the telegraph companies invariably ended in combination, and that the public was ultimately obliged to pay for the construction of duplicate lines which were not needed, and which were only constructed for the purpose of forcing a "divide" of the enormous sums charged the public for a public service which was a natural adjunct of the postal service.

"It would seem," said Mr. Thurber, "that so far as electric communication is concerned, the only effective and feasible remedy against the present evils existing in this connection would be for our Government to follow the example of Great Britain, and take, without further delay, for public use, both the telegraph and telephone. The latter invention bids fair in the near future to supersede, in a great measure, the use of the telegraph. Already circuits of many miles are worked in daily practice, and the various companies are combining and consolidating at a rate which bids fair soon to monopolize the entire business, with the inevitable result which occurs with all great organizations where prices are not fixed by law of overcharging the public which has been induced by low charges at first to make use of an invention until it so enters into the operations of our daily life as to become a necessity. Constitutional lawyers claim that the right exists in the people, through their Government, to take any property required for public use at an appraised value. Under this right the State delegates its power to private persons or corporations for the construction of various public works. The question is now pressing for answer, shall the United States follow the example of Great Britain, and, by buying existing lines or building new ones, give the whole people the benefits of electric communication in all its forms at a reasonable cost, or shall it permit the present state of things to continue? In the one case, electric communication could be extended to every Post Office, whereas now less than one-third are reached, the charges could be greatly reduced, and the large and constant growth in electric communication secured to the whole people."

Mr. Thurber urged that a strong attempt be made to remedy these abuses, and the following resolution was presented and adopted:

*Resolved*, That the results of the operation of the telegraph in Great Britain, as a part of the postal system of that country, are such as to commend the adoption of a similar system to the people of the United States.

Messrs. Delano, Haines & Co., of 55 Broadway, promoters of electrical enterprises, have organized in Cleveland, Brooklyn, and several other large places, a new system of District Messenger service, designed to greatly increase and dispatch business. Their system of alarm and telegraph is also in demand for use in private dwellings, and is well worth investigation by every one. The Rev. Dr. Schenck commands it in the following terms:

"With one of the District Telegraph Company's annunciators in his house or office, a man is his own post-office, night watch, express office, fire alarm, telegraph office, errand boy, etc., and all this cheaply and promptly, with certainty and efficiency. What a *multum in parvo!* I pity a man who don't run a machine."

# Telephonic.

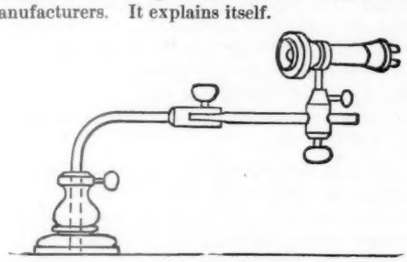
A. W. Gray, General Manager of the Tropical American Telephone Co. (limited), whose headquarters are in Barbadoes, who has charge of the company's affairs in that part of the globe, is at present sojourning in New York. Under his active supervision, the affairs of the company have progressed most satisfactorily. Barbadoes has an exchange of considerable importance at present, and the other islands are rapidly falling into line. Mr. Gray is a genial and courteous gentleman, and deserves to succeed.

A very successful trial of an improved telephone was made a few days ago in Boston over a line 563 miles in length. Conversation was carried on for three hours. The articulation was very distinct and powerful enough to be heard with the receiving telephone six inches from the ear.

### The Telephone in the Fire Alarm Service.

The municipal authorities of Darmstadt, after a prolonged examination of the various apparatus for signaling the outbreak of fire, have decided upon the exclusive use of the telephone for this purpose. The Bell-Blake system has been selected as the most suitable for this purpose. A set of telegraph wires, including the whole town, is to be constructed and so arranged that the central office can communicate with every station singly, or with all at once. The apparatus will be supplied and erected by the Berlin firm, Armin Tenner.

The American Bell Telephone Company has issued the following circular to its licensees and manufacturers. It explains itself.



BOSTON, Nov. 1, 1882.

*To Licensees and Manufacturers:*

The attention of this Company has been called to a circular signed by "The Adjustable Telephone Support Co.," which has been widely distributed, and which claims a monopoly in adjustable telephone stands.

The matter has received our consideration, and it has been ascertained that the assertions of the circular referred to, that "all adjustable supports for telephones now in use infringe upon this patent," and that "this patent covers all forms of an adjustable telephone support," are not true, and have no foundation.

The above drawing shows the form of support protected by the patent cited, the scope of which is extremely narrow and limited; and unless the precise construction in every respect, as shown in the drawing, is followed, there is no infringement.

Yours truly, THEO. N. VAIL,
*General Manager*

Peter Cooper, the millionaire, enjoys life on a diet of oatmeal. If he were poor and could afford nothing better he would doubtless feel as miserable as a man who publishes a three-cent paper in a one-cent town.

"In selecting a wife," recently remarked Jay Gould to his son, "always select one with a perfect figure"—somewhere between three and five millions.

### Telephone Case.

DECREE FOR PRELIMINARY INJUNCTION.

In May 1882, suit was brought by the American Bell Telephone Company against one John J. Ghegan, of Newark, N. J., for infringement of their telephone patents, and motion was made for preliminary injunction. Mr. Ghegan was understood to be an agent of "The People's Telephone and Telegraph Company," an organizaiton based upon the patents of Mr. Geo. M. Hopkins. These patents were principally for different forms of battery telephones.

The case was for some months vigorously defended, much expert testimony being adduced by affidavit on both sides. Mr. Ghegan was supported by the aforesaid People's Telephone and Telegraph Company. After many delays the case was argued at Trenton, N. J., on Friday and Saturday Nov. 17th, and 18th, in the United States Circuit Court before Judge Nixon, resulting in favor of the American Bell Telephone Company, and a decree for preliminary injunction against the infringing parties.

We annex a copy of the decree:

CIRCUIT COURT OF THE UNITED STATES,
THIRD CIRCUIT, DISTRICT OF NEW JERSEY.

IN EQUITY.

AMERICAN BELL TELEPHONE COMPANY ET AL.
*vs.*
JOHN J. GHEGAN.

*Decree for Preliminary Injunction.*

The motion for a preliminary injunction in this case came on to be heard on affidavits and proofs filed by the respective parties, and Edward N. Dickerson and James J. Storrow, Esqs., appeared for the complainants, and George Harding, A. Q. Keasbey and H. D. Donnelly, Esqs., appeared for the defendant; whereupon the parties were heard and the Court doth find, order, adjudge and decree that the defendant, combining and confederating with the People's Telephone and Telegraph Company, a corporation, complained of in the bill, has infringed and threatens to continue to infringe the rights secured to the complainants by the two patents named in the bill, granted to Alexander Graham Bell, one whereof is dated March 7, 1876, and numbered 174,465, the other whereof is dated Jan. 30, 1877, numbered 186,787, and that an injunction issue thereupon restraining him, his servants, workmen and agents, and all others acting under or with him, from further infringing the same until the further order of this Court.

A true copy. JNO. T. NIXON, *J.*
[SEAL.] S. D. OLIPHANT, *Clerk.*

PRELIMINARY INJUNCTION.

CIRCUIT COURT OF THE UNITED STATES,
THIRD CIRCUIT, DISTRICT OF NEW JERSEY.

*The President of the United States*
TO JOHN J. GHEGAN, *Greeting:—*

*Whereas:* The American Bell Telephone Company, the Metropolitan Telephone and Telegraph Company, and The Domestic Telephone Company lately exhibited their bill of complaint in the Circuit Court of the United States for the District of New Jersey, against you, the said defendant, praying to be relieved touching the matters therein complained of, and especially that you, combining and confederating with the People's Telephone and Telegraph Company, a corporation established under the laws of the State of New York, have infringed the rights of the complainants as owners of the two patents granted to Alexander Graham Bell, one numbered 174,465, dated March 7, 1876, and the other numbered 186,787, dated Jan. 30, 1877, praying that you and all acting under you may be restrained from further infringing the patent and the rights of the said complainants in the premises, in the said bill mentioned, in any way or manner contrary to law or equity: We, therefore, in consideration thereof, and also of the particular matters in the said bill set forth, do strictly command and enjoin you, the said John J. Ghegan, your servants, workmen and agents, and all others acting under or with you, and each and every of you, that from henceforth *you do absolutely and entirely desist and refrain* from the further constructing or using or selling, in any way or manner, directly or indirectly, the electric speaking telephones above referred to, and others infringing the claims of said two patents described in the said bill of complaint and in the affidavits of the complaints, thereto annexed, until the hearing of the cause or the further order of the said Court.

Witness the Hon. Morrison R. Waite, Chief Justice of the United States, at Trenton, this eighteenth day of November, A. D. 1882, and in the one hundred and seventh year of the independence of the United States. S. D. OLIPHANT,
[SEAL] *Clerk of the Circuit Court,*
Allowed Nov. 18, 1882. JNO. T. NIXON, *J.*
A true copy. S. D. OLIPHANT,
[SEAL] *Clerk.*

### Food Makes the Man.

Speaking roughly, says the *Lancet*, about three-fourths, by weight, of the body of man is constituted by the fluid he consumes, and the remaining fourth by the solid material he appropriates. It is therefore no figure of speech to say that food makes the man. We might even put the case in a stronger light and affirm that man *is* his food. It is strictly and literally true, that "A man who drinks beer thinks beer." We make this concession to the teetotalers, and will add that good sound beer is by no means a bad thought factor, whatever may be the intellectual value of the commodity commonly sold and consumed under that name! It cannot obviously be a matter of indifference what a man eats and drinks. He is, in fact, choosing his animal and moral character when he selects his food. It is impossible for him to change his inherited nature, simply because modifications of development occupy more than an individual life, but he can help to make the particular stock to which he belongs more or less beery or fleshy or watery, and so on, by the way he feels. We know the effect the feeding of animals has on their temper and very natures; how the dog fed on raw meat and chained up so that he cannot work off the superfluous nitrogenized material by exercise becomes a savage beast, while the same creature fed on bread and milk would be tame as a lamb. The same law of results is applicable to man, and every living organism is propagated "in its kind" with a physical and mental likeness. This is the underlying principle of development. Happily the truth is beginning, though slowly and imperfectly, to find a recognition it has long been denied.

| | |
|---|---|
| Mexican Bell Telephone stock | 4½ |
| American Bell Telephone stocks | 178½ |
| Western Union Telegraph " | 81½ |
| Mutual Union " " | 23 |

### The Grain Crop of 1882.

Commissioner Loring, in his annual report, estimates the yield of grain in 1882 as follows: Corn, 1, 635,000,000 bushels; wheat, 410,-000,000 bushels; oats, 470,000,000 bushels; barley, 45,000,000 bushels; rye, 20,000 000 bushels; buckwheat, 12,000,000 bushels.

Slumber not in the tents of your columns. The world is advancing, advance with it.—*Mazzini.*

A telephone has been placed in a church at Olean, N. Y., and, when preaching about future punishment, every time the pastor utters the word which indicates the place where bad people are supposed to go after death, the operator at the central office pipes out, "What number, please."

### Experiments in Telephony.

M. Van Rysselberghe has communicated the following interesting note to *L'Opinion:*

The Minister of Public Works having, a short time since, ordered some experiments of telephony on long distances to be made, a complete application of the system of M. Van Rysselberghe was made upon the lines of the Belgian telegraphic network. The trials took place on Saturday, the 7th October, and were crowned with complete success. At Brussels, at the Observatory, were stationed: M. Olin, Minister of Public Works; Mr. Fish, Resident Minister of the United States charged by his Government to inform them on the new method; M. De Large, Director of Telegraphs; M. Weissembruck, Secretary to the Minister of Public Works; M. Hooreman, doing duty for the director of the Observatory, and M. Van Rysselberghe. At North Brussels: M. Buels, head of the telegraph administration office. At Anvers: Inspector Banneux. At Ostend: Engineer Lambotte and M. Walraevens, assistant officer of the Observatory. From 2 to 4 o'clock, whilst the telegraphic work was at its maximum, these persons communicated with each other with the greatest ease by wires taken at random into the network of telegraphic lines, and whilst these wires continued to transmit telegrams by their ordinary service. Thus, for example, the wire connecting the Observatory of Brussels with its post at Ostend served simultaneously the service of the telemeteorograph, a Morse telegraph, and the telephonic correspondence. Then the wire (No. 2 in the nomencleture of the Belgian State lines, and devoted at present to the service of the Hughes' fast speed telegraph) transmitted duplex telegrams, that is to say, messages which crossed each other in both directions, of which one set was directed towards Anvers, whilst the others went towards Brussels; and at the same time, by the same wire, conversation was carried on between M. Banneux and the Minister of Public Works.

The Minister expressed his opinion that the correspondence between the two towns was much better than the communications actually exchanged between two offices in the same town. In fact, the voice arrived clear, distinct and powerful. It is important to notice that this triple communication only required a single wire; there was no return wire. M. Olin sent to Mr. Fish, Minister of the United States, as a *souvenir* of the experiments at which he had been present, the ribbon bearing one of the ordinary telegrams received by a Morse instrument at the same moment that Mr. Fish was speaking to M. Banneux, by the same wire. This is the text of the telegram:—"The present Morse despatch is transmitted from Anvers to Brussels by the aid of a wire by which a telephonic conversation is simultaneously carried on by means of the apparatus and arrangements of M. Van Rysselberghe." Similar demonstrations will shortly take place in London.

### Bugbears.

Some twelve months ago the writer was somewhat startled by the assertion of a prominent Western Union superintendent that the curse of all telephone exchanges was the perennial "dead-head," and there was no hope of his effectual elimination.

The assertion seemed all the more conclusive from the fact that he hailed from a center of telephony, where, doubtless, the most rigid management prevailed, and where all methods had failed to accomplish the purpose, and yet there remained a doubt that would not down.

So persistent was this doubt that it finally culminated in an effort to suppress the thankless traffic; the effort resolved itself into a system, and that it has proven entirely efficacious no one who will take the trouble to investigate will remain unconvinced.

Before proceeding, it may not be amiss to clear up some of the mists that surround the business in point.

In the first place (start not!), it is a legitimate calling, protected by both State and municipal laws; and, where the laws are not so explicit as might be desired, the usual contribution in the shape of occupation and other taxes meets in equity the right of recognition.

In the second place, a man who habitually uses a telephone, or, for that matter, at all, without paying for it, or having any idea of doing so, is unworthy of all consideration.

He could hardly be convicted of petty larceny, and yet he is more deserving of reproach in that he takes up valuable time, without even the courteous recognition, "I thank you."

In the third place, that famous subscriber who took the telephone merely to help the thing along, is becoming phenomenally scarce; in fact, it would be hard to find two of him in a very wide range of vision.

He may tell you so, and possibly many of them do, but when his "battery" gets out of kelter, or, being in a certain line of business, he fails to effectuate an understanding with the fellow that called him up, it is probably not a bold flight of fancy to suspect that you will hear from him almost as previously as you do from the brusque, bustling, business boomer, who frankly tells you that he rents that machine to use, and doesn't care the snap of his finger how much you make out of it so long as it goes bang up.

These points—that it is an authorized calling, that the d— b— is too far removed beyond the pale of respectablity to enter as an obstructive factor, and that the subscriber actually pays for his instrument with the expectation of being treated with more consideration than those who do not pay being conceded—one may contrive to look upon him and analyze his character as he would proceed to do with any other example of the *genus homo.*

Did you ever have one of them to ask you how many he might allow to use his telephone? And do you recall how, persistently ignoring facts, you racked your brain to give him the widest consistent limit, and never once recognized that he was merely seeking an opportunity to throw the responsibility of refusals on your shoulder?

Then the next time look him squarely in the eye, and proceed in this wise:

"You do a good deal of business with No. 6?"

He nods assent.

"Well, my friend, so do many others, and there are so many calls for them at one and the same time that we are compelled to keep a record, and make the connections in rotation. Now, we have discovered that fully one-half these connections are for deadheads, and you want to increase your disadvantages, I suppose?"

Subscriber reflects.

Then explain to him how, when waiting on a non-subscriber, who calls up on the same board a little before he does, the operator must wait on him first, and we think you have him.

But for all this he is not going to say *no*, and right here the system referred to comes beautifully into play.

There is a wide-spread superstition, to use a Southern phrase, among managerial magnates, that probably found its greatest development in telegraphic circles, to the effect that operators are incapable of the exercise of judgment, or would abuse the right of discretion.

And so they have been hedged around with inflexible rules, and distrusted, and pounced upon through special wire traps leading to managerial lairs, until doubtless many have been terrorized into abject machines.

Let us urge another plan, with the guarantee that it will more than meet the most sanguine expectation.

It is very simple, and applicable to the largest exchange.

Managers cannot be too careful in the selection of operators, this is granted of course; but the selection being made, it is no more than right that we should treat them with proportionate confidence.

Indeed, the promise of even a slight advance from time to time will not, as a rule, cast a damper over their feelings.

These preliminaries being accomplished, confine each operator to as few subscribers as possible, and our word for it, she or he will prove a dullard among dullards, if the voices of subscribers and such of their employes as habitually use the telephones are not soon "booked."

The dead-head that runs this gauntlet will be lucky enough, and even should he pass, his first sentence will probably condemn him, *when he should be ruthlessly cut off.*

Experience does not show that subscribers object to this, when candidly informed that they were called by a person who had no right to use the telephone.

On the contrary, while hundreds have been so eliminated during the past ten months, only one complaint has arisen, and that was explained away in five minutes.

And now we defy anyone to use one of two hundred and fifty telephones, unless he has authority.

True, the bulk of connections has been decreased, and the subscriber hardly gets his hand away from his bell before it jingles in response, but there is no audible gnashing of teeth over this.

And still it grows and grows. J. K. D.

San Antonio, Texas.

*P.S.*—It should probably be mentioned that some exceptions are made to this rule, to wit:

Anyone is allowed to call a physician, and even physicians who "do not need" telephones at their residences are permitted to harass the druggists in their own interest.

A fire alarm can be given by anyone.

The army of commercial men are given full sway, and this in full knowledge of the propensity of some of this painfully retiring class to abuse and vilify in other places the system they have just left and which costs them nothing.

Transient guests at hotels are also on the free list, but these end the chapter. D.

We were favored with a call yesterday from the veteran telegraphers, Messrs. Beetle & Doolittle, the former having just returned from a very successful business trip in New England, and the latter from an equally successful pleasure trip up in the woods of Maine, where he displayed his usual good marksmanship by bringing down a score of partridge and two very large deer in a two days' hunt.

Subscribe to THE REVIEW OF THE TELEGRAPH AND TELEPHONE AND ELECTRICAL JOURNAL, and you will be posted on all current matters of an electrical nature.

Spinks went home the other night, afflicted with double vision. He sat for some time with his sleepy gaze riveted on Mrs. S., and then complacently remarked: "Well, I declare, 'f you two gals don't look 'nough like to be twins."—*Boston Gazette.*

The following tables show the properties of the various kinds of telegraph and telephone wires exhibited by Mr. Lazel Weiller at the recent electrical exhibition held at Munich, Bavaria. This showing includes the new wire recently patented by him; it is made of a new alloy, a silicious bronze in which the deoxident consists of a silicious metalloid that produces a better conductor than phosphorus.

I.—*Table showing Properties of Silicious Bronze Wires.*

| Nature of Wire. | Diameter. | | Electrical Resistance per Kilometer. | Resistance Kilogs. | Conductibility Compared with Copper. | Resistance to Rupture, Tons per square inch. |
|---|---|---|---|---|---|---|
| | mm. | in. | ohms. | | | |
| Copper | 1 | .04 | 20.36 | 21.8 | 100 | 12.3 |
| Telephone phosphor-bronze wire | 1 | .04 | 70 | 70 | 29.3 | 56.3 |
| Telephone silicious bronze wire | 1.08 | .042 | 48 | 80 | 36 | 56.3 |
| Telepgraph silicious bronze wire | 1.30 | .051 | 12.13 | 67 | 97 | 32.1 |
| Silicious bronze wire covered with magnetic oxide for telegraph lines, in the vicinity of the sea and at railway stations | 1.50 | .06 | 9.7 | 91 | 93 | 33 |
| Telegraph silicious bronze wire | 1.70 | .067 | 8.6 | 137 | 82 | 38 |
| Telegraph silicious bronze wire | 1.94 | .076 | 5.8 | 140 | 93 | 33 |

If we take as a type of telephone conductor the wire 1 mm. in diameter, and as a type of telegraph line the wire 2 mm. in diameter, the comparison with wires in ordinary use will be as in the following Table:

II.—*Comparison of Phosphor and Silicious Bronze with Iron and Copper Wires.*

| Nature of Wire. | Resistance to Rupture. | Electrical Resistance per Kilo. | Conductibility Compared with Copper=100. | Resistance to Rupture. |
|---|---|---|---|---|
| | kilo. | ohms. | | tons pr sq. in. |
| I. *Telephone Wires 1 mm. dia.* | | | | |
| Silicious bronze, Weiller | 70 | 56 | 36 | 56.3 |
| Phosphor bronze, Weiller | 70 | 70 | 29.3 | 56.3 |
| Phosphor-bronze, Montefiore | 59 | 107 | 19 | 48 |
| Swedish iron | 28 | 135 | 15.8 | 22.7 |
| Siemens-Martin steel | 32 | 166.8 | 13.3 | 26.5 |
| Pure copper | 21.8 | 20.57 | 100 | 12.3 |
| II *Telegraph Wires 2 mm. dia* | | | | |
| Silicious bronze, Weiller | 157 | 5.1 | 97 | 33 |
| Phosphor-bronze, Weiller | 138 | 6.4 | 76 | 27.9 |
| Swedish iron | 113 | 33.8 | 15.8 | 22.7 |
| Siemens steel | 132 | 41.7 | 13.3 | 26.5 |
| Pure copper | 87 | 5 | 100 | 12.3 |

III.—*Weight of Different Telegraph Wires of Equal Conductivity.*

| —— | Diameter. | Resistance. | Weight per Mile. |
|---|---|---|---|
| | mm. | ohms. | lb. |
| Silicious bronze | 2 | 5.1 | 88.5 |
| Phosphor-bronze | 2.13 | 5.1 | 110.8 |
| Swedish iron | 5.10 | 5.1 | 584 |
| Siemens steel | 5.70 | 5.1 | 931 |

One of the most feasible, economical, and durable of the underground wire systems which has come to our notice is that patented by Capt. William Mackintosh, of Providence, R. I. This system is now in use in this city, Philadelphia, and several other places, and is being rapidly brought into general use. We shall illustrate it at an early day.

The *Sounder*, a new monthly electrical journal published by Homer H. Hallock, of Kalama, W. T., reaches us as we are going to press. Mr. Hallock is an old telegrapher and electrician, and, from the contents of his first edition, promises well to make an interesting paper. We wish him success.

Subscribe for Review of the Telegraph and Telephone and Electrical Journal.

## NEW PATENTS—ELECTRICAL—1882.

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING OCTOBER 3RD, 1882.

265,297. Automatic Telegraph. Frank Anderson, Peekskill, N. Y., assignor to the American Rapid Telegraph Company, of Connecticut. Filed May 20, 1881. Renewed Sept. 6, 1882. (No model.)

265,340. Attachment to Dynamo-Electroplating Machines. Samuel M. Puffer, Detroit, Mich. Filed Feb. 11, 1882. (No model.)

265,358. Automatic Telegraph. Frank Anderson, Peekskill, N. Y., assignor to the American Rapid Telegraph Company, of Connecticut. Filed May 20, 1881. Renewed Sept. 6, 1882. (No model.)

265,456. Combined Key-Board, Automatic Switch, and Magneto Generator for Telephone-Calls. James P. Stabler, Sandy Spring, Md. Filed May 18, 1882. (No model.)

265,488. Dynamo-Telegraphy. Georges D'Infreville, New York, N. Y., assignor to the Western Union Telegraph Company, same place. Filed Apr. 27, 1881. (No model.)

265,489. Dynamo-Telegraphy. Georges D'Infreville, New York, N. Y., assignor to the Western Union Telegraph Company, same place. Filed Apr. 27, 1881. (No model.)

265,292. Electric Lamp Support. William Wheeler, Concord, Mass. Filed Feb. 13, 1882. (No model.)

265,311. Electric Lamp and Holder for the same. Thomas A. Edison, Menlo Park, N. J., assignor to the Edison Electric Light Company, New York, N. Y. Filed Feb. 5, 1880. Renewed Aug. 14, 1882. (Model.) Patented in England Feb. 10, 1880, No. 578; in Italy Apr. 28, 1880; in Belgium Apr. 30, 1880, No. 51,155; in Victoria June 15, 1880, No. 2,842; in France June 16, 1880, No. 136,088; in India June 23, 1880, No. 415; in Sweden June 25, 1880; in Canada July 19, 1880, No. 11,520; in New South Wales July 26, 1880; in Queensland Aug. 3 1880; in Austria-Hungary Aug. 13, 1880; in Portugal Sept. 22, 1880, No. 621; in Norway Sept. 24, 1880; in New Zealand Oct. 18, 1880, No. 484; in Russia Dec. 14, 1881; in Germany Dec. 31, 1881, No. 15,602, and in Spain Jan. 2, 1882.

265,315. Electric Lamp. John H. Guest, Brooklyn, N. Y. Filed Nov. 22, 1880. (No model.)

265,410. Electric Incandescent Lamp. John H. Guest, Brooklyn, N. Y. Filed Dec. 6, 1881. (No model.)

265,475. Electric Lamp. Sidney Waters, London, England. Filed May 3, 1882. (No model.)

265,290. Governor-Valve for Electric Lighting Apparatus. Georges A. Tabourin, Marseilles, France. Filed May 11, 1882. (No model.) Patented in France Jan. 5, 1881.

265,353. Printing-Telegraph. Aloys Wirsching, Brooklyn, N. Y. Filed Nov. 26, 1881. (No model.)

265,519. Regulator for Dynamo-Electric Machines. John W. Langley, Ann Arbor, Mich. Filed Mar. 9, 1882. (No model.)

265,455. Signal-Transmitter for Telephone-Calls. James P. Stabler, Sandy Spring, Md. Filed Jan. 27, 1882. (No model.)

265,454. Telephone Local Call-Instrument. James P. Stabler, Sandy Spring, Md. Filed May 4, 1882. (No model.)

WEEK ENDING OCT. 10, 1882.

265,786 Apparatus for the electric transmission of power, T. A. Edison, Menlo Park, N. J.

265,785 Dynamo electric machine, T. A. Edison.

265,853 Dynamo electric machine, A. J. Muller, New York, N. Y.

365,779-84 Dynamo electric machine regulator, T. A. Edison, Menlo Park, N. J. (6 patents.)

265,858-9 Dynamo electric machine regulator, I. F. Ott, Newark, N. J. (2 patents.)

265,937 Dynamo electric machine regulator, E. Thompson New Britain, Conn.

265,756-7 Electric signal for railway trains, J. P. Clark, Philadelphia, Pa. (2 patents.)

265,775 Electric arc light, T. A. Edison.

265,776 Electric lighting system, T. A. Edison.

265,677 Electric signal, I. Kitsee, Cincinnati, Ohio.

265,753 Electric signaling apparatus, J. H. Cary, Boston, Mass.

265,576 Electrical transmitter, G. J. Carney and J. V. Meigs, Lowell, Mass.

265,861 Electrode for batteries, J. Pitkin, Clerkenwell, Middlesex County, Eng.

265,778 Electro-magnetic railway engine, T. A. Edison, Menlo Park, N. J.

265,720 Grapnel for raising telegraphic cables, S. Trott and H. Kingsford, Halifax, N. S.

265,645 Multiplex telegraph, B. Thompson, Buffalo, N. Y.

265,936 Preventing flashing between electric conductors, E. Thomson, New Britain, Conn.

265,789 Telegraphic recording instrument, E. V. Essick, Alliance, Ohio.

265,877 Telephone switch, T A. Watson, Everett, Mass.

265,912 Watchman's electric register, G. W. Adams, Boston, Mass.

WEEK ENDING OCT. 17, 1882.

266,252 Burglar-alarm, M. Decker and J. K. Deming, Chicago, Ill.

266,236 Carbon holder, for arc-lamps, A. G. Waterhouse, New York.

266,171 Conduit for underground electric conductors, W Mackintosh, Providence, R. I.

266,241 Cut-out for electric circuits, E Weston.

266,234 Device for suspending arc-lamps, A. G. Waterhouse, New York.

266,243 Dynamo or Magneto electric machine, E. Weston, Newark, N. J.

266,244 Electric indicator, E. Weston.

266,242 Electric lamp, E. Weston.

266,240 Electric arc-lamp, E. Weston.

266,161 Electric arc lamp, O. Kartzmark, New York, N. Y.

265,693 Electric arc light, E. Thomson, New Britain, Conn.

266,027 Magneto electric railway signal, W. W. Gary Boston, Mass.

266,235 Magneto or dynamo electric machine, A. G. Waterhouse, New York.

266,187 Manufacture of Incandescent electric lamps, J. V. Nichol, Brooklyn, N. Y.

266,056 Mechanical telephone exchange, G. F. Shaver Erie, Pa.

266,172 Plate for secondary batteries, J. A. Maloney, Washington, D. C., and C. H. Koyl, Cobough, Ontario, Canada.

266,129 Portable galvanic battery, C. Gibbs, New York.

266, 176 Printing telegraph, W. J. McCausland, Philadelphia, Pa.

266,090 Secondary battery, C. F. Brush, Cleveland, O.

266,114 Secondary battery, A. K. Eaton, Brooklyn.

266,262 Secondary battery, W. A. Shaw, Brooklyn, N. Y.

266,089 Secondary or storage battery element, C. F. Brush, Cleveland, O.

266,239 System for the electrical transmission of power, E. Weston, Newark, N. J.

265 972 Telephone circuit and apparatus, W. D. McKinney, Boston, Mass.

266,021-2 Telephone, T. A. Edison, (2 patents.)

266,043 Telephonic transmitter, G. F. Milliken, Boston, Mass.

WEEK ENDING OCT. 24, 1882.

266,303 Apparatus for creating vacuums in incandescent-electric lamp globes; H. J. Muller, New York, N. Y.

266,292 Battery telephone, L. Jacobson, Berlin, Germany.

266,319 Circuit for annunciators of telephone exchanges, C. E. Scribner, Chicago, Ill.

252,290 Dynamo electric generator, R. C Hindley and W. S. Buffham, Racine, Wis.

266,405 Electric annunciator, J. C. Warner, Chicago, Ill.

266,353 Electric cable, P. B. Delaney, New York, N. Y.

266,549 Electrical fixture, L. Stieringer, New York, N. Y.

266,469 Electrical machine, E. Guerin, Paris, France.

266,337 Electric arc lamp, J. D. F. Andrews, Charleton, Kent co., England.

266,455 Electric arc lamp, W. S. Freeman, New York, N. Y.

266,447 Electric incandescent lamp, T. A. Edison.

266,358 Electric incandescent lamp, H. Goebel, New York.

266,363 Electric lamp, C. F. Heinrichs, London, England.

266,550 Electric light chandelier, L. Stieringer, New York.

266,483 Junction for conductors of systems of electrical distribution, J. Kenesi, Menlo Park, N. J.

266,068 Magneto telephone, T. A. Watson, Everett, Mass.

266,286 Microphone, C. D. Haskins, New York, N. Y.

266,287 Multiple switch-board for telephone exchanges, C. C. Haskins and C. H. Wilkins, Chicago, Ill.

266,297 Railway signal apparatus, J. R. Lawrence, Boston, Mass.

266,344 Telegraph central office system and apparatus, H. W. Breckenridge and J. W. Duxbury, Providence, R. I.

266,321 Telephone exchange system, C E. Scribner.

266,295 and 266,374 Telephone switch, C. W. Davis, Chicago, Ill.

265,320 Telephone switch-board and pneumatic signal therefor, C. Scribner, Chicago, Ill.

266,277 Telephone receiver and automatic circuit breaker combined, W. H. Eckert, J. A. Seely and E. C. Eckert, New York.

266,592 Perforator for automatic printing telegraphs, A. F. and F. B. Johnson, Brooklyn, N. Y.

267,588 Vacuum apparatus, T. A. Edison, Menlo Park, N. Y.

266,518 Watchman's time detector, G. F. Ransom, Cleveland, O.

The new Diamond Carbon Telephone Battery manufactured by the Electrical Supply Company, 109 Liberty street, New York, (to which we shall refer at another time) although one of the simplest in construction, has been found to be one of the most efficient and constant for use in telephone exchanges, &c.

The Ansonia Brass and Copper Company are now manufacturing line wire, brass and copper wire, office and annunciator wire of new designs for telephone, telegraph and electric light purposes, and also zinc rods, battery copper and other electrical apparatus on a very extensive scale.

A. L. Bogart, one of the largest manufacturers of patent improved burglar alarms, house annunciators, hotel annunciators, electric call bells and new designs of electric burners and gas lighting apparatus has recently opened a large store and factory at 22 Union Square. See description of new electric devices made by him in advertisement herein, and send for catalogue.

---

THE ANSONIA

## Brass & Copper Co.,

MANUFACTURERS OF

## PURE ELECTRIC COPPER WIRE,

**For Magnets, Telephones, Electric Lights, etc.**

WITH H. SPLITDORF'S PATENTED LIQUID INSULATION COVERED WITH COTTON OR SILK.

**LINE WIRE.**

**FIRE PROOF HOUSE AND OFFICE WIRE**

FOR INDOOR USE IN ELECTRIC LIGHTING.

WROUGHT METAL GONGS, FOR ANNUNCIATORS, TELEPHONES, &c.

**ZINC RODS, BATTERY COPPER, &c.**

Nos. 19 and 21 Cliff Street, New York.

---

## CARBON POINTS

FOR

Electric Lamps,

AND

PLATES FOR BATTERIES.

We make a superior carbon for electric lamps; straight, burning with a clear white light, and of the greatest possible durability.

*Our Battery Plates are the best in the market.*

Send for samples and price list.

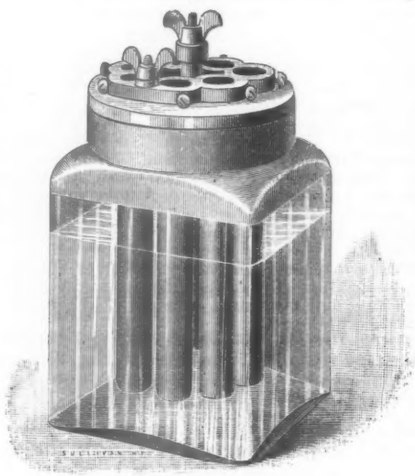
**Boulton Carbon Co.**

CLEVELAND, OHIO.

---

THE "DIAMOND"

## Carbon Telephone Battery.



[PATENT APPLIED FOR.]

**Jar, 6 inches high, 4 inches square.**

FITS ANY TELEPHONE BOX.

HAS MORE THAN

## Double the Carbon Surface

OF ANY OTHER BATTERY.

EXCELS FOR

Constancy, Simplicity and Price.

*ELEMENTS.*

7 Sticks Round Carbon, ⅝ in. diameter, 5½ in. long.
Amalgamated Zinc, ⅝ diam.
Sal ammoniac.

*Price Complete, $1.25 per Cell.*

**Subject to Liberal Discount in Quantities.**

[FAC SIMILE OF LABEL, REDUCED IN SIZE.]

### THE "DIAMOND" CARBON BATTERY

DIRECTIONS.

1.—Place in the Jar strong cut best Sal Ammoniac, which thoroughly dissolve, filling with water to the shoulder of the Jar.
2.—See that the cover fits as nearly air tight as possible, and that the rubber on the zinc rests on the top of the glass.
3.—Keep in a dry place if possible, be careful that a good, firm, clean contact is made.

NOTICE!

As every part of the Battery except the glass is made at our own Factories, we warrant the quality, and purchasers may be assured of uniformity and care in its manufacture.

The Battery has more than double the Carbon surface of any other, and the small parts to get out of order can be lost; it is also easily and cheaply renewed.

MANUFACTURED BY

THE ELECTRICAL SUPPLY CO.

Warehouse: 109 Liberty Street, New York.

Factory at Ansonia, Conn.

---

## SPECIAL NOTICE.

***To Telegraph and Telephone Employes:***

Being promoters of Telegraph and Telephone Companies, we offer you extraordinary facilities to make small investments, where the returns are

QUICK, SURE AND LARGE.

We guarantee against loss. A new District Telegraph Company is about to be organized in an excellent field. A limited number of shares will be sold, at a very low figure, to telegraph and telephone employes.

For particulars, address,

HAINES BROS.,

55 Broadway, N. Y.

---

## A. L. BOGART,

ELECTRICIAN,

**No. 22 UNION SQUARE, N. Y., 4th Avenue Side,**

PATENTEE

And Manufacturer of every variety of

## Electric Gas-Lighting Apparatus

*For Theatres, Churches, Public and Private Buildings.*

**THE TRADE FURNISHED**

WITH

The most complete assortment of Electric Lighting Burners, including Pendant, Ratchet, Argand, Billiard Table, Candle, Automatic, and Vibrators, also Clough, Maxim, Tirrell Ring and Arm Burners, for use with Machine Gas.

BATTERIES, PRIMARY COILS, THREE STYLES OF AUTOMATIC CUT-OFFS, AND ALL SUPPLIES NECESSARY IN FITTING UP BUILDINGS.

*ALL APPARATUS PATENTED.*

**Also, Burglar Alarms, Annunciators, Call Bells, &c.**

---

## A. C. NORTHROP,

**WATERBURY, CONN.**

**IRON AND BRASS MACHINE SCREWS,**

**Zinc in Sheets and Plate**

*FOR ELECTRICAL PURPOSES.*

PARTS FOR TELEGRAPH AND TELEPHONE INSTRUMENTS

MANUFACTURED FROM

Iron, Brass, Steel or Zinc.

Opportunity to Estimate on patented articles from Sheet Metal, Rod or Brass Castings, respectfully solicited.

JOHN TURNER, President. JOHN P LORING, Sec. and Treas.

THE

# CENTRAL AMERICAN

## Telegraph & Telephone Co.

CAPITAL STOCK, - $100,000.

*SHARES $10 EACH.*

*FULL PAID AND NON-ASSESSABLE.*

This Company has acquired and owns *all* the telephonic rights formerly the property of the American Bell Telephone Company, Continental Telephone Company, and the Tropical American Telephone Company, Limited, in **Central America** and **Panama.**

The Company **BUYS** its telephones and transmitters, and thereby avoids paying royalties.

A limited number of the shares of the stock is offered for sale at $5 per share.

Address,

JOHN P. LORING, Treasurer,

Sears' Building, BOSTON, Mass.

---

## PAINE & LADD,

HALBERT E. PAINE, Late Comm'r of Patents, STORY B. LADD. } Washington, D.C.

**SOLICITORS OF PATENTS,**

And Attorneys in Patent Cases.

---

## BANNING & BANNING,

## PATENT ATTORNEYS

AND

## SOLICITORS,

21 Park Row, Honore Building.

NEW YORK. CHICAGO.

---

## CONNOLLY BROS. & McTIGHE,

## PATENT ATTORNEYS

AND

## SOLICITORS.

**Electrical Cases a Specialty.**

91 GRANT ST., PITTSBURGH, PA.

914 F STREET, WASHINGTON, D. C.

—AND—

1001 CHESTNUT STREET, PHILADELPHIA, PA.

---

# THE FITCH

## CHLORINE BATTERY.

PATENTED SEPT. 16, 1879.

The cheapest, cleanest, most economical, durable and decidedly the

**Best Open-Circuit Battery**

IN USE FOR

**Telephones, Annunciators, and Electric Bells.**

After several years of constant use, it is pronounced to-day as being *far superior* in constancy and power to all other batteries for the above purposes, notwithstanding all statements to the contrary. We have made several valuable improvements in this Battery, among which is the substitution of a *non-corrosive* and *adjustable clamp*, in place of the old style lead cap, which warrants us in saying that the **Chlorine Battery has no equal in the market,** and all we ask is a trial.

PRICE, $1.50 PER CELL.

LIBERAL DISCOUNT TO THE TRADE.

## PARTRICK & CARTER,

Sole Agents and Manufacturers of

BELLS, ANNUNCIATORS,

**Telegraph and Electrical Instruments and Supplies**

OF EVERY DESCRIPTION.

No. 114 South Second St., Philadelphia, Pa.

Send for Catalogues and Circulars.

---

## SHORT-HAND WRITING

thoroughly taught by mail. Good situations procured all pupils when thoroughly competent. First-class stenographers furnished railroad officials without charge for my services Correspondence solicited.

**CALIGRAPHS SOLD.**

Special inducements offered business men, lawyers, stenographers and railroad officers.

Send for COLLEGE REPORTER and caligraph circulars to

W. G. CHAFFEE, Oswego, N. Y.

---

## THE WEST INDIA

## Telegraph & Telephone Company,

LIMITED.

*CAPITAL STOCK, - - $150,000.*

SHARES, $10 EACH. FULL PAID ARE NON-ASSESSIBLE.

Transfer Office, LONG BRANCH, NEW JERSEY.

T. C. MORFORD,

*Register of Transfers.*

Operating under license from the TROPICAL and AMERICAN BELL TELEPHONE COMPANY for the Islands of Hayti, San Domingo, Jamaica, Porto Rico, St. Croix, Vicque and Culebra, has been granted concessions from the Governments of the Islands for exclusive right to the exchange system for telephones. This Company **BUYS** their **TELEPHONES** and **TRANSMITTERS,** thereby avoid paying royalties.

**A PORTION OF THE STOCK FOR SALE.**

Address

The West India Telegraph and Telephone Co.

CHILLICOTHE, OHIO.

---

# DELANO & HAINES,

## PROMOTERS AND BROKERS,

55 BROADWAY,

EXECUTIVE OFFICES OF

"THE MEXICAN TELEPHONE CO."

AND

The Tropical American Telephone Co.,

(LIMITED.)

*Both operating under license from the American Bell Telephone Co.*

**Valuable Telephone Territory**

can be had by parties who can furnish the money requisite to develop it, in the Republic of **Mexico,** the **West India Islands,** and **South America.**

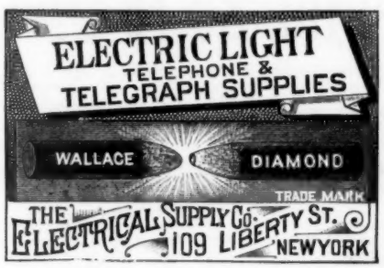
## Telephone and Electrical STOCKS

BOUGHT AND SOLD.

—§—

Capital procured for legitimate enterprises. Electrical inventions a specialty.

---




---

## GEO. H. WHIPPLE,

56 Wall St., N. Y.

## ELECTRIC LIGHT, TELEPHONE, TELEGRAPH,

—AND—

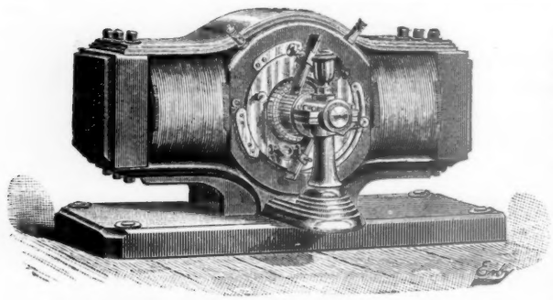
## Miscellaneous Stocks.

# VAN DEPOELE ELECTRIC LIGHT COMPANY,

MAKERS OF

## Electric Lighting Apparatus.

OFFICE & WORKS, VAN BUREN & FRANKLIN STS., CHICAGO, ILLS., U. S. A.



This Company has fully established its record for construction of the most approved system of Electric Lighting Apparatus. Producing lights of the highest standard of purity, and requiring the smallest consumption of power compared with the result obtained; the system having been examined and tested by the most competent electrical judges in America and Europe with the most satisfactory conclusions. This Company are prepared to compete for the furnishing of Electric Plants of any capacity required.

Catalogues and Price Lists, containing Testimonials and list of parties using this system, will be furnished on application.

JOHN M. PATTERSON,

## Patent Broker,

Telephonic and Electrical Apparatus

A SPECIALTY.

91 GRANT STREET,

PITTSBURGH, PA.

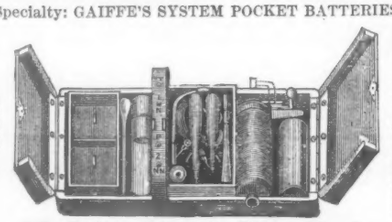
F. W. WAGNER,

Manufacturer of

ELECTRO-MEDICAL APPARATUS.

Specialty: GAIFFE'S SYSTEM POCKET BATTERIES.

Send for Catalogue and Prices.



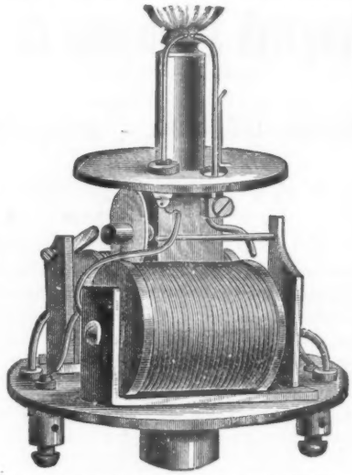
Awarded First Medal at Cincinnati Exposition, 1880.

36 John Street, New York.

RHODES'

## Electric Gas Burner.

Patented May 31, 1881; April 25, 1882; May 2, 1882.



ADAPTABLE TO ANY PLACE WHERE GAS IS USED.

IT SAVES GAS.

WORKS ON OPEN OR CLOSED CIRCUIT BATTERY.

ENTIRELY AUTOMATIC.

SMITH & RHODES ELECTRIC CO., Limited,

No. 95 FIFTH AVENUE, NEW YORK.

# The "MORSE" LEARNERS' INSTRUMENT THE BEST.

**PRICE $3.75** complete with Battery, Book of Instruction, Wire, Chemicals and all necessary materials for operating.

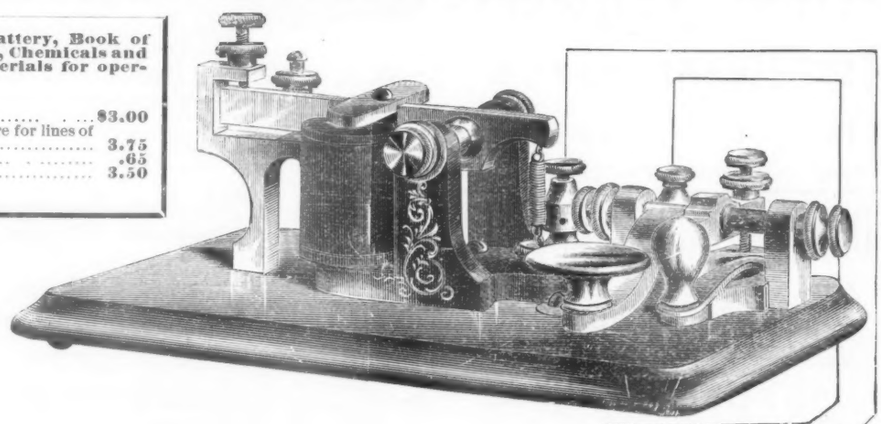
| | |
|---|---|
| "Morse" Instrument alone, without battery | $3.00 |
| "Morse" Instrument without battery, and wound with fine wire for lines of one to fifteen miles | 3.75 |
| Cell of battery complete | .65 |
| "Morse" Learners' Instrument, without battery, sent by mail | 3.50 |

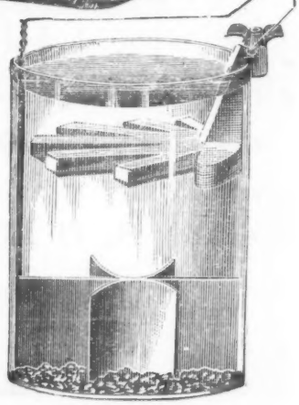
(Battery cannot be sent by mail.)

☞ Goods sent **C. O. D.** to all points if one-third of the amount of the bill is sent with the order. Remit by Draft, Postal Money Order, or Registered Letter. Favorable arrangements made with Agents everywhere.

☞ **We will in every case refund any remittance made us for these goods, if they are not found to be entirely satisfactory.**

**You are sure of getting the BEST THAT IS MADE if you select the "MORSE."**





**The "Morse"** is a full size, well made, complete MORSE TELEGRAPH APPARATUS of the latest and best form for learners, including handsome Giant Sounder and Curved Key, and a large Cell of the best Gravity Battery, latest form.

IT IS THE BEST WORKING SET OF LEARNERS' INSTRUMENTS FOR SHORT OR LONG LINES, FROM A FEW FEET UP TO TWENTY MILES IN LENGTH, YET OFFERED.

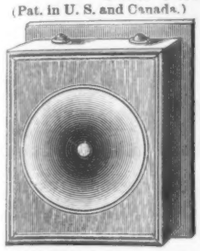
# J. H. BUNNELL & CO.,

## 112 Liberty Street, New York.

## Holcomb's New Amplifying Telephones

**FOR PRIVATE LINES.**

(Pat. in U. S. and Canada.)



**The Latest and Best.** These new instruments embody recent and important improvements. They excel in **clearness and volume of Tone.** The only durable and reliable substitute for the Electric Telephones. Highly commended by business men. **Work Two Miles.** Price, $10 per set.

**Used with Galv. Steel Cable Wire,** price **5cts.** per rod. Illustrated circulars and testimonials sent **free.** (Mention this journal.)

Address,

**J. HOLCOMB & CO., Atwater Block, Cleveland, O.**

## Union Electric M'f'g Co.

Nos. 7 & 9 BOND STREET,

NEW YORK.

**TELEGRAPH ENGINEERS & CONTRACTORS,**

MANUFACTURERS OF

Telegraph Instruments,

**Gold and Stock Instruments,**

Electric Light Apparatus,

**Domestic Appliances,**

**District System and**

Fire Alarm Boxes,

Railway Signals,

*Telephone Apparatus, &c.*

DEALERS IN

**ELECTRICAL SUPPLIES**

OF ALL KINDS.

**Agents for sale of goods of the celebrated SILVERTOWN WORKS, LONDON.**

Agents for the American Insulator Co.

Agents for the Celebrated K. K. Insulated Wire,

ALSO

**THE KERNER STYLOGRAPHIC PEN.**

## ALFRED F. MOORE,

MANUFACTURER OF

**INSULATED WIRE,**

—FOR—

Telephone, Telegraph and Electric Light,

Office, Line and Annunciator WIRE,

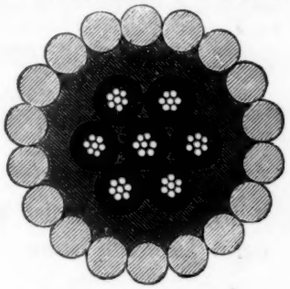
Magnet Wire and Fexibble Cordage.

200 & 202 N. THIRD STREET,

PHILADELPHIA, PA.

## THE BISHOP Gutta-Percha Works

**(SAMUEL BOARDMAN, Agent)**



Original and only Manufacturers in the United States of

GUTTA-PERCHA INSULATED

Submarine Telegraph Cables,

50 Regular Sizes—One to Ten Conductors.

Subterranean Telegraph Cables,

Hempen-Armored Covered.

Aerial Telegraph Cables,

Lead or Hempen Covered.

ANTI-INDUCTION

Telephone (Lead-Covered) Cables,

as used by the Metropolitan Telephone and Telegraph Company.

Torpedo Cables,

Recommended by the European and South American Governments.

Lead-Covered Cables,

For Canal and Streamlet Crossings.

*GUTTA-PERCHA*

OFFICE WIRE, FUSE, LEADING AND CONNECTING WIRE,

For Subaqueous, Mining and all other Electrical purposes.

MARK'S COMPOUND INSULATED WIRE,

For Office, Outdoor, Underground and Battery Use.

G. P. OFFICE WIRE, COTTON-COVERED.

ALSO HAVE ALWAYS ON HAND

WIRES OF EVERY VARIETY OF INSULATION,

Magnet Wire, Telephone Flexible Cords, Flexible Elevator Cables, Electric Cordage,

BURGLAR-ALARM AND ANNUNCIATOR WIRE,

Electric Light Wire, Cordage and Cables, Lead-Covered Wire, and Every Description of

PURE GUTTA-PERCHA GOODS,

Gutta-Percha Sheet, for Cable Splices; G. P. Chemical Vessels for Acids, etc.

Agents for Reception of Orders and Sale of Goods:

L. G. TILLOTSON & CO., 5 and 7 Dey Street, New York.

WILLIAM HEATON, 508 Chestnut Street, Philadelphia.

THIRTY-THREE YEARS' EXPERIENCE HAS TAUGHT US THAT NEITHER THE ELECTRICAL NOR MECHANICAL QUALITIES OF EITHER GUTTA-PERCHA OR COPPER DETERIORATE BY LONG WORKING OR SUBMERSION, CONSEQUENTLY THE BEST FORM OF A SUBMARINE TELEGRAPH CABLE WILL BE THAT IN WHICH THESE CONDITIONS WERE FULFILLED.—*Extract from Report on Cables, by Willoughby Smith.* Manufactured by

*The Bishop Gutta-Percha Works.*

Address all communications to

**W. W. MARKS, Superintendent.**

420, 422, 424 and 426 East 25th Street, New York.

OFFICE AT THE WORKS.

## Electric Light Machinery

One four horse power Lewiston Water Motor.
One Steam Gauge.
One Engine Speed Register.
Three Dynamo Machines, one ten light American, one three light Weston, one three light United States.
One Bradley Galvanometer and Rheostat.

A large assortment of

**Gutta Percha and other Insulated Wires,**

AND OTHER

**ELECTRICAL APPARATUS & SUPPLIES**

All in good condition, some of them never having been in use. Apply for list to

JEROME REDDING & CO.

*30 Hanover St., Boston, Mass.*

THE

## LAW BATTERY.

The BEST Open Circuit Battery in the World and the CHEAPEST.

Combines all the advantages of the best of the others, without any of their disadvantages.
Thousands sold monthly. Send for circular.
Manufactured and sold by the

LAW TELEGRAPH CO.,

*140 FULTON ST., NEW YORK.*

## TOBEY & KINSMAN,

**145 BROADWAY—86 LIBERTY ST., NEW YORK.**

TELEPHONE,

Telegraph and Electric Light

SUPPLIES.

DEALERS IN

**Electrical Goods.**

**INVENTORS' AND MANUFACTURERS' AGENTS.**

This paper will be devoted to the sole purpose of keeping you conversant and thoroughly posted on all topics of an electrical nature, which may be brought out from time to time, in this country and Europe.


**L. G. TILLOTSON & CO.**

Manufacturers, Importers and Dealers in

RAILWAY

TELEGRAPH & TELEPHONE

SUPPLIES

OF EVERY DESCRIPTION,

Nos. 5 & 7 DEY STREET,

NEW YORK.

**EUGENE F. PHILLIPS,**

MANUFACTURER OF PATENT FINISHED

**Insulated Telegraph Wire,**

TELEPHONE AND ELECTRIC CORDAGE,

ELECTRIC LIGHT WIRE,

MAGNET WIRE. PATENT RUBBER COVERED WIRE,

Burglar Alarm and Annunciator Wire,

LEAD ENCASED WIRE,

ANTI-INDUCTION

AERIAL AND UNDERGROUND CABLES, ETC.

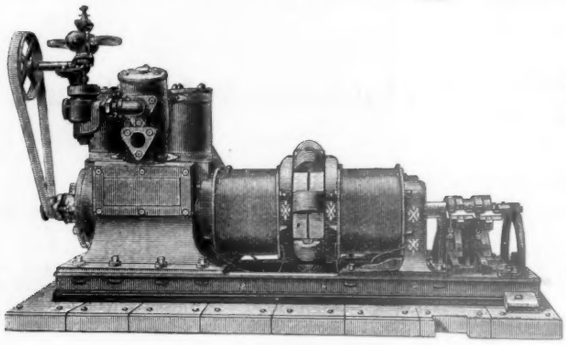
OFFICE AND FACTORY,

67 Stewart Street, Providence, R. I.

W. H. SAWYER, Electrician and Superintendent.

GEORGE WESTINGHOUSE, Jr. President. RALPH BAGALEY, Secretary and Treasurer. H. H. WESTINGHOUSE, Superintendent.

**The Westinghouse Engine**



AS CONNECTED DIRECT

—TO—

Dynamo Electric Machines

OF ANY MAKE

For Electric Lighting.

ALSO

INDEPENDENT ENGINES

For driving by Belt *without Counter-Shafting.*

Send for Illustrated Circular.

THE WESTINGHOUSE MACHINE COMPANY,

Works at Pittsburgh, Pa. 92 and 94 LIBERTY STREET, NEW YORK.

JOHN A. ROEBLING SONS CO.
MANUFACTURERS OF
TELEPHONE
AND
TELEGRAPH WIRE
WORKS AT TRENTON, N.J.
ALL KINDS WITH THE HIGHEST ELECTRICAL CONDUCTIVITY
OFFICE & WAREHOUSE 117 & 119 LIBERTY ST. NEW YORK.

The Works of the JNO. A. ROEBLING'S SONS CO., at Trenton, N. J., have facilities for producing large quantities of Telegraph Wire on short notice. The Belgian system of rolling long lengths of wire rods, and improved methods of galvanizing, were first introduced in the United States at these works. It insures the production of wire with few joints, and with a thick coating of zinc.

*"Phosphor-Bronze."*

**Phosphor-Bronze Telephone Wire,**

COMBINES HIGH ELECTRICAL CONDUCTIVITY AND RESISTANCE TO CORROSION WITH LIGHTNESS AND TENACITY.

*Standard Sizes, 16, 17 and 18, Stubs' Gauge.*

ADDRESS:

THE PHOSPHOR-BRONZE SMELTING CO., Limited,

512 ARCH STREET, PHILADELPHIA, PA.

Owners of the United States Phosphor-Bronze Patents, Sole Manufacturers of Phosphor-Bronze in the United States.

**J. H. LONGSTREET,**

MANUFACTURER OF

Telegraph and Telephone Supplies

OF EVERY DESCRIPTION.

9 Barclay Street,

*NEW YORK.*

J. P. SNYDER,

Patentee and Manufacturer of

ELECTRIC AUTOMATIC BURGLAR ALARMS,

POSITIVE SECURITY TO PERSON AND PROPERTY.

BANKS, STORES, DWELLINGS AND OUTBUILDINGS REGULATED, PROTECTED AND MADE IMPREGNABLE.

Office, No. 96 Fulton Street,

R. SIMPSON'S SPORTING GOODS STORE,

NEW YORK.

ELECTRIC ANNUNCIATORS

AND DEVICES FOR HOTELS AND PRIVATE HOUSES.

Particular attention given to repairing of

ALARMS AND ELECTRICAL DEVICES.

All Persons Sending for

Catalogues, or ordering articles advertised in our columns, will do us and our Advertisers both a great favor by mentioning that they saw the advertisement in

THE REVIEW OF THE

Telegraph and Telephone.

# DAVIS & WATTS,

BALTIMORE, MD.

AUTHORIZED MANUFACTURERS TO

## American Bell Telephone Co.

**We claim our Latest Improved**

**MAGNETO BELLS**

are the very best in use. They are unexcelled in strength, and are fitted with *noiseless brass tooth gearing*, which is *always absolute and reliable*, No rubber bands to stretch and lose their grip; no friction to get out of adjustment.

Our AUTOMATIC SHUNT is the simplest and most unfailing yet introduced.

We make the lids of our boxes of seasoned mahogany, which insures against shrinkage, and at the same time gives our bells a very handsome appearance.

We are always happy to send samples to managers of exchanges, and invite all to try our bells before ordering elsewhere.

Being Agents for the State of Maryland, and Proprietors of the Baltimore Exchange, we are practically conversant with the Telephone business, and know exactly what is needed.

## TELEPHONE AND TELEGRAPH SUPPLIES

OF EVERY DESCRIPTION.

CORRESPONDENCE SOLICITED.

ESTABLISHED 1846 — MUNN & Co. — PATENTS — NEW YORK

We continue to act as solicitors for patents, caveats, trade-marks, copyrights, etc. for the United States, and to obtain patents in Canada, England, France, Germany, and all other countries.

**Thirty-six years'** practice. No charge for examination of models or drawings. Advice by mail free.

Patents obtained through us are noticed in the **SCIENTIFIC AMERICAN,** which has the largest circulation, and is the most influential newspaper of its kind published in the world. The advantages of such a notice every patentee understands.

This large and splendidly illustrated newspaper is published **WEEKLY** at $3.20 a year, and is admitted to be the best paper devoted to science, mechanics, inventions, engineering works, and other departments of industrial progress, published in any country. Single copies by mail, 10 cents. Sold by all newsdealers.

Address, Munn & Co., publishers of Scientific American, 261 Broadway, New York.

Handbook about patents mailed free.

# WESTERN

# Electric Company,

**CHICAGO—INDIANAPOLIS—NEW YORK.**

MANUFACTURERS OF

## Telegraph Instruments

AND SUPPLIES.

Insulated Copper Wires, Electric Bells and Annunciators, Burglar Alarms, the Electro-Mecurial Fire Alarm, Electro-Medical Apparatus, Electric Gas-Lighting Apparatus, Edison's Electric Pen and Duplicating Press, the Gamewell Fire Alarm Telegraph Apparatus, Bi-Polar and Carbon Telephones, Telephone Exchange Apparatus, Underground Cables.

**ANSON STAGER, President. ENOS M. BARTON, V-Prest.**

CATALOGUES

Sent by mail on receipt of price in stamps or currency.

| | Pages. | Price. |
|---|---|---|
| I—Complete Set of Catalogues | 236 | 20c. |
| II—Telegraph Instruments and Supplies | 64 | 6c. |
| IV—Insulated Wire (included in II). | | |
| V—Electric Bells, Annunciators, Electro-Mercurial Fire Alarm | 32 | 3c. |
| VI—Electro-Medical Apparatus | 32 | |
| VII—Manual of Telegraphy and Catalogue of Private Line Instruments | 32 | free. |
| VIII—Condensed Price List | 20 | free. |
| X—Electric Bells, etc Descriptive | 12 | 3c. |
| XI—Magnets for Mills | 20 | 3c. |
| Sir Wm. Thomson's Nautical Instruments | 24 | 5c. |

# CHARLES WILLIAMS, JR.,

(ESTABLISHED IN 1856.)

Nos. 109 - 115 COURT STREET,

**BOSTON, MASS.**

AUTHORIZED MANUFACTURER OF

## THE AMERICAN

# Bell Telephone Co.

Magneto, Crank AND Push Button Call Bells,

Electric Bells,

District Bells AND Switches for Exchanges,

Annunciators, Etc.

*Telegraph and Electrical Instruments, Batteries, Wire, Insulators, and Telephone Supplies of every Description.*

# LECLANCHE.

PRISM BATTERY, COMPLETE. Size of Jar, 6x4½ inches.

## The Great Telephone Battery.

**THE STANDARD OPEN CIRCUIT BATTERY OF THE WORLD.**

**Over 500,000 cells now in use in the United States and 1,000,000 in Europe.**

ADOPTED BY ALL THE

TELEPHONE COMPANIES.

**The Simplest, Cleanest, Most Durable, Most Economical.**

Beware of Infringements and Cheap Imitations.

LECLANCHÉ BATTERY CO.

OR 149 W. 18th St., N. Y.

L. G. TILLOTSON & CO., 5 & 7 Dey St., N. Y.

## BOOKS FOR ELECTRICIANS!

—:JUST PUBLISHED:—

*A Descriptive Catalogue of the Latest and Best Books on*

**Electricity, Electric Light, Magnetism, &c.**

Copies sent free by mail on application to

E. & F. N. SPON,

PUBLISHERS AND IMPORTERS,

44 Murray Street, New York.

# WM. DAWSON & SONS,

AGENTS AND EXPORTERS OF

## Books, Newspapers, Periodicals, AND STATIONERY.

Sole Agents for Great Britain for the

NEW YORK REVIEW

—OF THE—

**Telegraph & Telephone,**

AND ELECTRICAL JOURNAL,

SUBSCRIPTION RATE, 10s. Per Annum.

*No. 121 CANNON STREET,*

LONDON, E. C., ENGLAND.

# WESTERN ELECTRIC COMPANY,

CHICAGO—INDIANAPOLIS—NEW YORK

## TELEGRAPH AND TELEPHONE APPARATUS AND SUPPLIES.

The Best of Everything at Bottom Prices.

# A. G. DAY,

Manufacturer of

**KERITE INSULATED**

## Telegraph and Telephone

*WIRE AND CABLES.*

OFFICE, 120 BROADWAY, NEW YORK.

FACTORY, SEYMOUR, CONN.

**ANTI-INDUCTION KERITE**

*TELEPHONE CABLES.*

*Some of them TWO MILES IN LENGTH, are in use in several cities, and are found to WORK PERFECTLY for that distance.*

**Eminent Electricians and Practical Telegraphists**

Commend and recognize the Kerite insulation as superior to all others At the CENTENNIAL EXHIBITION at Philadelphia, SIR WILLIAM THOMSON, the eminent Electrician and Scientist, awarded to the

KERITE INSULATED WIRE AND CABLES

A DIPLOMA

For "Excellence of the Insulation and Durability of the Insulator."

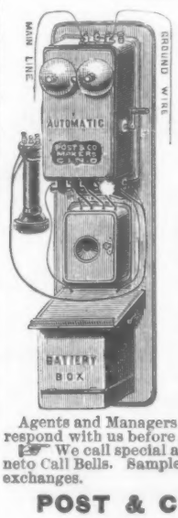
CLARK B. HOTCHKISS, GEN. AGT.

**120 BROADWAY, NEW YORK.**

## Telegraph & Telephone Department.

## POST & COMPANY,

CINCINNATI, OHIO.




LICENSED MANUFACTURERS OF

**American Bell Telephone Co.'s**

**MAGNETO AND ELECTRO**

**CALL BELLS, &c.**

Manufacturers of all kinds of

**Telephone Instruments,**

Bells, Plugs, Switch Boards, Annunciator Drops, Spring Jacks, Magneto Engines for Switch Tables, and dealers in all kinds of *Telephone Supplies* and Tools; in stock and for sale at lowest prices.

Galvanized Line Wire, all numbers; Insulated Wire, all numbers; Insulators and Brackets, all sizes; Batteries, all kinds and sizes, at lowest prices.

FULL ASSORTMENT OF

**Telegraph Instruments.**

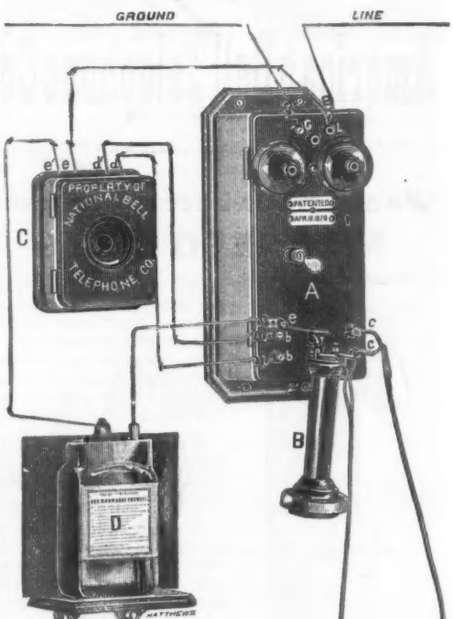
Agents and Managers of Exchanges are requested to correspond with us before purchasing.

☞ We call special attention to our new improved Magneto Call Bells. Samples sent on application to Agents and exchanges.

**POST & CO., Cincinnati, O.**

# The American Bell Telephone Co.

W. H. FORBES, President. W. R. DRIVER, Treasurer.
THEO. N. VAIL, General Manager.




This Company, owning the Original Patents of Alexander Graham Bell for the Electric Speaking Telephone, and other patents covering improvements upon the same, and controlling, except for certain limited territory, under an arrangement with the Western Union Telegraph Company, the Gold and Stock Telegraph Company, the American Speaking Telephone Company, and the Harmonic Telegraph Company, the patents owned by those companies, is now prepared to furnish, upon application, either directly or through any of its licensees, Telephones of different styles, and applicable to a variety of uses.

This company desires to arrange with persons of responsibility for establishing

**District or Exchange Systems,**

in all unoccupied territory, similar to those now in operation in all the principal cities in this country.

Responsible and energetic persons are required to act as licensees for the purpose of establishing

**PRIVATE LINE AND CLUB LINE**

systems, for business or social uses. Also to introduce the Telephone for

**SPEAKING TUBE**

purposes, for which instruments will be leased for a term of years at a nominal rental.

This Company will arrange for Telephone lines between cities and towns where Exchange systems already exist, in order to afford facilities for personal communication between subscribers or customers of such systems.

We respectfully invite attention to this matter, and any further information relating thereto can be obtained from the Company,

**No. 95 MILK STREET, BOSTON, MASS.**

All persons using Telephones, not licensed by this Company, are hereby respectfully notified that they are liable to prosecution, and for damages for infringement, and will be prosecuted accordingly to the full extent of the law.